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NATURALIST:

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MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND

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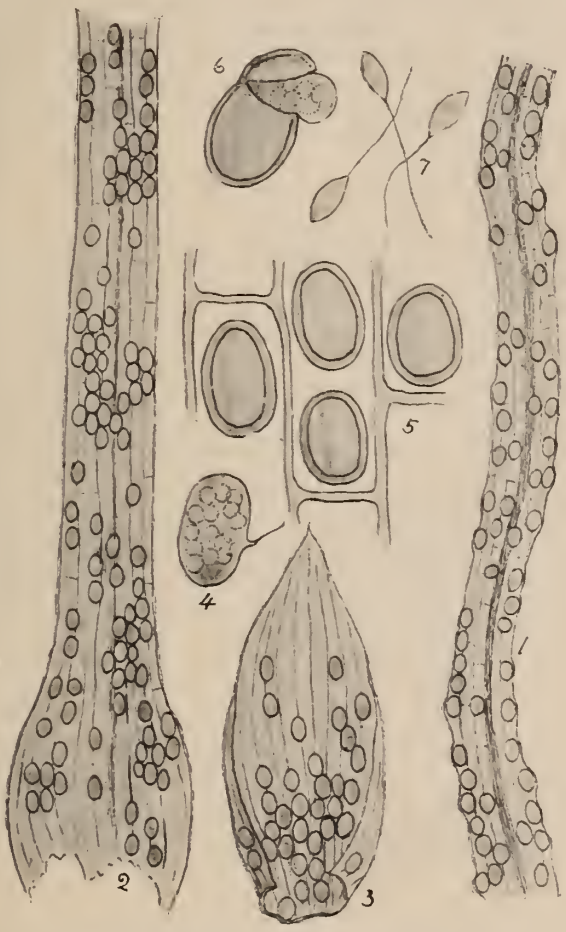
THE NATURALIST

FOR 1914.

NOTES AND COMMENTS.

A NEW GRASS PARASITE.

The *Journal of the Board of Agriculture* for November contains a paper by Mr. E. E. Stokes on 'Some Causes of



A new Grass Parasite (*Cladochytrium graminis* Busgen).

1. Resting-spores in fragment of grass root × 65.
2. ,, ,, ,, grass leaf. × 65.
3. ,, ,, flowering glume. × 65.
4. Zoosporangium containing zoospores. × 400.
5. Resting-spores in cells of leaf. × 400.
6. Resting-spores commencing to germinate. × 400.
7. Free zoospores. × 600.

Infertility of Peaty Soils,' in which he principally refers to the Eastern Midland counties; 'Silver-leaf Disease,' by Mr. F. T. Brooks; 'Some Douglas Fir Plantations,' by Professor F. Story, and 'A New Grass Parasite,' by Mr. G. Massee. This parasite was first observed in this country in 1908, and has been notified from several widely-separated localities in the South of England. Its name is *Cladochytrium graminis* Büsgen, and so far has only been observed to attack species of Festuca and other grasses with small leaves, and is consequently most prevalent on lawns. The symptoms of its presence are the appearance of small yellowish patches, a few inches across, which enlarge and gradually cover the lawn. We are kindly permitted to reproduce the plate which accompanies Mr. Massee's article.

ROMAN REMAINS IN YORKSHIRE.

According to *The Bradford Antiquary*, some of our Yorkshire antiquaries are emulating the good old times when anything found that could be looked upon as at all ancient was dubbed 'Roman.' It is quite possible that the roads which are figured in the paper on 'Slagheaps at Harden.' may be Roman, but the photographs are anything but convincing, and we quite agree that the arguments given in their favour are 'of a rather circular nature.' 'It is difficult to believe that this road is not part of the Roman line, in which case it should have a kerb. . . . If these remains are accepted as being Roman it is difficult to believe that the further course has not been through Bradford, etc.' It is all 'difficult to believe.' In another paper on Roman Roads in Yorkshire, a weathered squared stone is figured. It contains no inscription, but in the author's opinion is a Roman milestone, though we read 'beyond the milestone for more than a mile passing south of East Carlton I found no signs of the road.' Similarly, 'a farmer, working in a furnip field. . . . in answer to my enquiries told me he had not seen any loose stones in the field in which he was working, indicating the line of the road as pointed out to him by me.' This sort of thing is not of the most convincing character. It is quite possible some of the remains may be of Roman date.But surely such words as 'possible' and 'probable' would not spoil the value of the papers.

JOINTS.

At a recent meeting of the Yorkshire Geological Society, Professor P. F. Kendall delivered an address on 'Jointing in Stratified Rocks.' He said that little or no attention had been given to the subject by British observers, as though the question was closed. He had found no full and consecutive

account of the jointing in any area, and though in text books it was commonly declared that joints were in the direction of dip and strike, one could rarely find a body of data to justify the statement. The accumulation of such data might very well be kept as a subsidiary object of the field meetings of the society. Many theories for the formation of joints had been advanced, but there were needed more detailed field observations over large areas, diverse in age, composition, and lie. Professor Kendall enumerated the following questions yet to be answered on the subject of jointing: Are joints really the dip and strike? Do joints stand perpendicular to bedding? Are all the beds in one vertical section jointed similarly as to direction, inclination, or relative strength? Are joint systems continuous from bed to bed? Are joints above a break in the succession affected by those below? What effect has faulting on joints? Are joints affected by a second folding of strata?

MEMORIAL TO WILLIAM NELSON.

Naturalists in Yorkshire are joining in a memorial to the late William Nelson, of Leeds, who died a few years ago, and left behind a very valuable collection of shells and an extensive scientific library. These it is proposed to buy, and hand over to the University of Leeds as a memorial to one who, in his lifetime, was one of the ablest naturalists in the country in his particular branch of science, having been the first president of the Conchological Society of Great Britain. His great collection of shells is of world-wide interest, and is peculiarly valuable as affording a study of the mollusca. It is particularly fitting that the memorial to him should take the form proposed, since the presence at the University of his great collection will add considerably to the opportunities for study, and will be accessible, of course, to all naturalists who take an interest in the subject. We note that these various collections are being housed in the University; one wonders what about the museum at Leeds!

ALFRED RUSSEL WALLACE.

The recent death of Alfred Russel Wallace removes from our midst the last of the real giants of the scientific world. There is not living to-day, so far as we know, a man who can even approach him. Born so long ago as 1823, he had been spared to accomplish much. Like his friend Darwin, he was of a very quiet and retiring disposition, and could very rarely be induced to take part in any public gathering—the Darwinian celebrations being an outstanding exception, his presence at which no doubt being due to a sense of respect and duty to Darwin. To Wallace, almost equally with Darwin, was the credit of the first ideas of the theory of Evolution. He received the Order of Merit. Among his many monumental contri-

butions to science are 'Natural Selection,' 'The Geographical Distribution of Animals,' 'The Malay Archipelago,' 'Travels on the Amazon,' and only a few years ago, 'My Life,' which was a magnificent record.

GIFTS TO LEEDS UNIVERSITY.

The University of Leeds has received, through Professor P. F. Kendall, an offer of two important and interesting gifts, and the University Council at their meeting recently accepted these gifts with pleasure. Mr. Godfrey Bingley, who has for a period of twenty years been actively connected with the Yorkshire Geological Society, presents a collection of lantern slides illustrating architecture, archæology, geology, and scenery in all parts of England, but especially in Yorkshire. There are roughly ten thousand slides of exquisite workmanship, and the whole collection is admirably arranged and catalogued. It is certainly one of the most interesting collections of lantern slides in existence, and that section which deals with the geological and geographical aspects of Yorkshire is unequalled. The second gift is from an anonymous donor, and takes the form of a sum of £20 to be used for the purchase of the unique collection of fossils from the marine bands of the coal measures of Yorkshire, made by the late Mr. Henry Culpin, of Doncaster. We are delighted to find that these two collections have been secured for the county.

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Dr. Marie Stopes' inaugural lecture at the University College on 'Palæobotany: its past and its future,' is printed in *Nature*, No. 2299.

The chief items in the *Irish Naturalist* for December are 'The Irish species of Petrobius' (Bristle-tails or Rock jumpers), by Prof. G. H. Carpenter, and an obituary notice of the late R. J. Ussher, by Mr. R. M. Barrington.

In *British Birds* for December the Barred Warbler is recorded for Lincolnshire, and Mr. T. A. Coward points out that the Red Shelducks recorded for Cheshire had been bred by Lord Newton in Lime Park, and escaped.

We are pleased to see that Part 9 of Mr. S. S. Buckman's *Yorkshire Type Ammonites* has made its appearance, and deals with the following species:—*Ammonites nativus, phillipsi, nitidus, fasciatus, peregrinus, crassoides*, and *vorticellus*.

In *The Entomologist's Monthly Magazine* for December there are two paragraphs written by Norman H. Joy. The first is headed '*Thinobius longicornis* Joy: a Correction,' in which he alters a name previously given, from *longicornis* to *macroceros*. The second is '*Xantholinus substrigosus* Joy: a Correction.' In the latter he hastens to correct a bad mistake he made—'the species I described as *X. substrigosus* is therefore nothing more than *Leptacinus batychrus* Gyll.' If this sort of thing goes on, our Joy will be turned into sorrow!

NOTES ON FUNGUS HABITATS.*

T. GIBBS.

Among fungus habitats woodlands necessarily take the first place, as it is there we find the greatest accumulation of their food materials, decaying wood, twigs, leaves, etc. Woodlands may be divided according to the kind of trees of which they are composed. Thus we have (1) fir woods; (2) beech woods; (3) oak woods, and (4) mixed deciduous woods. Large numbers of fungi are found in fir woods only, typical species being *Tricholoma rutilans*, *Clitocybe phyllophila*, *Collybia conigena*, *Flammula sapinea*, *Hypholoma capnoides*, *Hygrophorus hypothejus*, *Lactarius deliciosus*, *Thelephora laciniata*, and *Clavaria abietina*. Beech woods also have a very distinctive fungus-flora, although the number of species strictly confined to them is much smaller than in the case of fir woods. Among the more interesting are the edible *Cantharellus cibarius*, the parasitic *Armillaria mucida*, and the tiny *Mycena capillaris*, which grows on the dead leaves. Many of the larger fungi, although not confined to beech woods, may yet be considered typical beech wood fungi, as they are there found in greatest abundance. Among these may be named *Tricholoma terreum*, *Cortinarius elatior*, most of the *Russulæ*, *Hebeloma glutinosum*, *Boletus edulis*, and *Hydnum repandum*. Oak woods, with dry, and often stony, soil and undergrowth of bracken, have generally a poor fungus-flora, but in their more open spots we may find many of the larger Agarics, as *Amanitopsis vaginatus*, *Amanita rubescens*, *Paxillus involutus*, *Collybia maculata*, and *Lactarius turpis*. Allied to the oak woods are the birch-clad hillsides which so often lie between them and the open moor. These are the chief habitat of the beautiful but deadly 'Fly Agaric' (*Amanita muscaria*). Very few fungi are found on the moors themselves, but a pretty primrose-yellow variety of *Omphalia umbellifera* is common on peaty banks high up mountain sides. *Cantharellus aurantiacus*, usually a fir-wood species, may also be found on peaty banks on the moors, and another fir-wood species, *Flammula sapinea*, has a variety which grows among the heather on the moors. The closely-cropped grass of hillside and upland pastures seems specially favourable to the pink-spored genera such as *Entoloma* and *Leptonia*. On the other hand, rich, well-manured pastures are the chief habitat of the true mushrooms and the large edible *Tricholomas*, *personatum*, *gambosum*, and *panæolum*, and the other well-known edible species, the 'Fairy-ring Champignon' (*Marasmius oreades*). In swamps we find *Collybia clusilis*, *Pholiota mycenoides*, *Naucoria semi-orbicularis*,

* Read at the Sandsend Fungus Foray, 1913.

Tubaria paludosa, and *stagnina Galera sphagnorum* and *Psilocybe uda*, and in damp woods under alders *Naucoria scolecina* and *conspersa*. Many of the smaller fungi grow on or among living mosses, the habitat being often attested by the name. Thus we have *Collybia muscigena*, *Galera hypnorum*, *Cantharellus muscicola*. Among the Discomycetes the genera *Barlæa* and *Neottiella* and several species of *Humaria* are muscicolous. These are most often found in the winter months.

There are other special fungus habitats which can here only be briefly referred to. Among these are burnt soil, old plaster walls, old sacking, linen, and other textile fabrics, and all kinds of domestic refuse.

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FIELD NOTES.

BOTANY.

Re-discovery of *Carex Pseudo-cyperus* in the East Riding.—In the middle of August Mr. J. Cox, of Beverley, and some friends paid a visit to the site of Meaux Abbey, of which scarcely a vestige now remains. Part of the moat and ponds—probably fishponds—belonging to the powerful religious Order who lived there in mediaeval times, were easily traced, and in the latter, and also in ditches adjoining, this most interesting Carex was growing in great profusion. After a search extending over many years by local botanists, the old Teesdalian record in 'Beverlac' of this plant in Dumble Pit, near Beverley, has been confirmed. Its present habitat is not a long distance from the above-mentioned pit, which had been searched many times in vain.—J. J. Marshall, Grimsby.

—: o :—

GEOLOGY.

Millstones in Yorkshire.—Two Millstones have been removed into Cannon Hall Pleasure-grounds from the site of an old windmill in the Parish. A fragment I sent to Jermyn street is described as 'lava from Neidermendig, near Andernach, in the Eifel. Petrologically the rock has been called a leucite-nepheline-tephrite. The stone was used by the Romans for Millstones, and has been quarried for the same purpose ever since.' In a Guide to the Rhine, it is mentioned that "a great many of these millstones have been found among the Roman ruins in England." I should be glad to know if any have been found in our Yorkshire 'Roman ruins,' and whether this is a kind of millstone generally or frequently found at old Mills.—Charles F. Pratt.

[Hand millstones of Roman date, made from Andernach phonolite, are not at all uncommon on Roman sites, and have been recorded for Yorkshire and other northern counties.—Ed.].

NOTES ON THE GENUS MYCENA.*

IVY MASSEE.

Up to the present time I have only examined about half the number of British species, but already have come to the conclusion that the present system of classification does not satisfactorily define the species. The primary sections of the genus are each founded upon a single character which is only characteristic of the typical form of each, and, like all other attempts at classification founded on a single character, proves to be of doubtful value. I have found that microscopic are more stable than macroscopic characters.

Cystidia.—Many species of Mycena possess cystidia, and, so far as I have observed, their presence or absence is constant, as is also their shape. In this genus the cystidia, when present, are arranged in two ways: (1) scattered over the surface of the gill mixed with the basidia; (2) confined to the margin where they are often arranged in clusters. This last arrangement is what constitutes the characteristics of the old section *Calodontes*, where the edge of the gill is bristly and coloured under a lens, due to the presence of cystidia containing colouring matter.

Basidia.—In the majority of species the basidia have four sterigmata, but a few possess only two, as in *M. galericulata*. The basidia vary considerably in size in the different species, but are not considered of any value as a specific character.

The Trama, or median portion of the gill, is always constant in structure in the same species, and sometimes affords important characters. In some cases it is composed of long, narrow cells, running parallel, and closely packed together, leaving practically no air spaces, as in *M. rugosa*. When the trama presents this structure the gill is tough and pliant.

In other species the trama is composed of very large, inflated subglobose cells, with numerous air spaces, as in *M. galopoda*. This structure is characteristic of brittle gills, the brittleness being due to the pressure of the cells on the unyielding air spaces. This character is best studied in the genus Russula.

Laticiferous hyphæ are present in the gills of some species, and contain the white or coloured liquid called milk, such as is present in the group *Lactipes*.

Spores.—The epispore in most species of Mycena has the same refractive index as water, consequently is not seen; but a large globule which is usually present is sharply defined, and so in some instances, when the globule has been mistaken for the spore, the latter has been described as globose. A weak solution of iodine stains the spore wall and shows the true spore-form.

* Abstract of paper read at the Sandsend Mycological Meeting, 20th September, 1913.

In Memoriam.

H. FRANKLIN PARSONS, M.D.

One is not fain to be an obituarist, but needs must when the evil circumstance drives. A great botanic publicist long lost

H. Franklin Parsons

to Yorkshire, but who did more to set it in its rightful place by systematic analysis and record over a few years than many less gifted have done in thrice the time, Dr. Henry Franklin Parsons died (aged 67) on October 30th at his residence in Croydon; his home, I believe, almost from the time when he left Goole in 1879, or early in 1880, on being appointed Medical Inspector of the Local Government Board, from which by reason of sad personal affliction, he retired in 1911.

Intimate, bound by a common love of problems botanical and chemical, from 1870 to 1880 at least, of late years distance interfered with acquaintance, but his two latest contributions to Science, 'The Flora of the Commons near Croydon' (1911), and 'Plant growth and Soil Conditions' (1913), may well serve to clew up and emphasise his intellectual equipment for investigation calling for acuteness of insight into facts, and their interpretation. A 'plain' man, as the world classes facial contours, to meet his eye, to hear him 'suggest' a view or expound a thesis, was to fall under the spell of a singularly simple, direct, truthful and insightful personality. Charles Darwin, alone of men I have met, impressed one with a like mental magic. 'Imagination,' that second-sight equipment which has in the past done more for exact science than most people are ready to allow, was perhaps his chief intellectual lack, but it was more than compensated for by his marvellous storehouse of knowledge, wide in its range, and inexclusive in its nature. He could seize a thing by the right handle and Epictetus of old said everything had two, one negligable — quicker than anyone I ever met, such was the mental alertitude of his character. In saying this one perhaps says enough; many of the members of the Yorkshire Naturalists' Union who knew him while still with us, are alive yet, though that calls to mind Canon Fowler, Thomas Hick, and other mind-friends of which the years have bereft us.

Physically, Dr. Parsons was lamentably unfortunate. The 'sword' ever tended to wear out the scabbard, his nervous energy was ever immense. Beginning to practise his profession in the country district of Beckington (near Bath) where my knowledge of him commenced, he came to Goole (his centre for the Selby Health area) in 1874, married Miss Wells (of Hook) a few years later, she pre-deceased him, to pass the last two years of his life, alas! for a man of such activity and open-air interests, a cripple. He himself so phrased it to the writer little more than a month before his death. An 'obscure disease' of the bone of the leg necessitated amputation. Yet he wrote cheerily enough, though no more able to trudge about as he used one time to do over the pits and barrows and through the pools of Riccal and Skipwith commons, enjoining his attendant satellites, on Sphagna bent, to 'up and on,' or 'away, my merry, merry men.' His contributions to Yorkshire botany, the back parts of the Union's Transactions bear testimony that in no single fact or conclusion has ever needed, or probably will need, revision or modification.

F. A. Lees.

Dr. A. Strachan, F.R.S., takes the position of Director of the Geological Survey, in place of Dr. J. J. H. Teall, who retires this month.

A NEW BRITISH AND YORKSHIRE ST. JOHN'S WORT.

F. ARNOLD LEES, M.R.C.S.

In the *Journal of Botany*, for Nov., Mr. C. E. Salmon, F.L.S., of Reigate, has capped his services to Yorkshire botany by the discovery, and differentiation of an intermediate kind of *Hypericum*, primarily as of Sussex, but incidentally for our northern County as well, through the medium of the Kew Herbarium. The name of the growth, a form of *H. quadrangulum*, betwixt *H. perforatum* of our sandy banks, and *H. tetrapterum* of wetter, boggier places, has been decided as properly *Hypericum Des' Etangsii* after its describer in 1841, who rightly ranked it under, but demarked it off from *H. quadrangulum* which meant both *H. dubium* Leers and *tetrapterum* Fries. These growths, three integers of the field aforetime, and now four—and it is almost certain that they pollinate or cross—have many characters in common, a half-round or squary stem, a pellucid punctation of the leaf (held up so as to see the light through) and a pellucid or opaque veining of the leaves viewed in the same way. These features are present, or shade off or are quite absent, in the several 'species.' This Sussex one *H. Desetangsii* has been found in the Kew Herb. gathered by Mr. Bowman at 'Richmond, Yorks.' Yes, now one is shown the track it needs no botanic Holmes to run it to earth. Baker in 'North Yorkshire' (p. 275) includes it under his *H. dubium*, as found up to 1,250 feet in Cotterdale (J. Percival), and I knew it well, deeming it a hybrid or an unnamed intermediate, in Blackburn dike spinney about a mile below Hawes in the same Wensleydale. In Swaledale by the river and Castle Bank slope at Richmond, lower down under Iron Bank, and higher up at Gunnerside I saw it in 1906 when touring the Dale a-foot with Edmund Bogg. As Mr. Salmon says, it will probably be found in other places; I would add, calcareous soiled situations. It has a family likeness to fine large leaved *H. perforatum*, but its stem is four-angular, the leaves more oval in contour with both dots and pellucid veining, and with broader sepals. From 'true' Leersian *dubium* which has a quadrangular stem, it is known by its punctate as well as clear-vein leaves and its narrower sepals, and from the old square-winged stemmed *tetrapterum* by its larger flowers, and its quite different leaf features. There is said to be an *imperforate* variety, demarked by Bonnet in 1878, but of this I know nothing. *No* pellucid dots would make the growth *H. 'dubium'* unrestricted, of a verity. So much, or so little, may there be in a name. The Sheffield (Don Valley, etc.) growth is true *dubium*, and so, I find, is the Wensleydale river-bank growth, judging by old herbarium specimens.

TROMBIDIUM BICOLOR HERMANN.

C. F. GEORGE, M.R.C.S.,
Kirton-in Lindsey.

SINCE my note on this mite appeared in *The Naturalist* for November, 1913 (see page 384), I have received some living examples from Mr. Falconer, of Huddersfield. I sent a specimen in preservative solution to Mr. Soar who has kindly made a drawing of it for me, it will be seen that its posterior margin

a.—*TROMBIDIUM BICOLOR* (Hermann). *c.*—First leg, terminal joint.
b.—Fourth and fifth joints of palpus. *d.*—Last leg, terminal joint.

is rounded. When it is remembered that the body is black, and the legs and palpi are a bright coral red, its name of bicolor will be appreciated. Figure *b* shews the fourth and fifth joints of the palpus, the claws at the terminal end of the 4th joint is seen to be double, but in one specimen, I found three claws on one side, and the usual two claws on the other. The eyes are coloured a dark red, and are prominent. It is a curious fact that these mites were found living in October.

MYCOLOGISTS AT SANDSEND.

C. CROSSLAND,
Halifax.

THE Twenty-fifth Annual Meeting of the Yorkshire Mycological Committee was held at Sandsend from 20th to 25th September, being the fifth occasion since the year 1900 on which the whole attention of the Committee, for the usual five days, has been devoted to Mulgrave Woods. We have been very much indebted to the Rev. the Marquis of Normanby for allowing us so often to explore these venerable woodlands, and to the Rev. W. G. Harland, Vicar of Lythe, for granting the use of the school at Sandsend as a general meeting-place.

There was an almost full attendance of the Mycological Committee, besides other members of the Union and friends, to the number of about twenty. The President of the Union put in a full attendance. The late James Needham, an almost constant attender since the Committee was formed, was missed. Mr. and Miss Ivy Massee, and Mr. A. Clarke, arrived on the Friday, and took a preliminary look round the district. The likelihood of a lighter crop than usual was reported, and so it proved. There was a scarcity of the larger species, even of the commoner kinds, due to the comparatively dry autumn retarding the development of the mycelium.

The heavy rain of Saturday night set going the dung fungi in the pastures, and by Monday fine specimens of *Anellaria separata*, and a few others which readily respond to autumn rains, were seen in fair quantity, notably four species belonging to the delicate genus *Bolbitius*, two of the four being additions to the flora of the district. The great majority however, are of a firmer substance, consequently more tardy in their development from mycelium growing in ordinary soil, leafmould, or rotting wood. Probably the somewhat unfavourable prospect stimulated us to increased energy in searching for the minuter kinds. Mr. Malone, though, is diligent at any time in hunting out microspecies of all descriptions. All the younger, and a few of the older members displayed great activity in their investigations. When there is a smaller crop we console ourselves by thinking that fungi out of the ordinary run may be found.

Splendid specimens of *Cortinarus* (*Phleg.*) *triumphans* were met with. Mr. Massee remarked that he had not had the good fortune to see this beautiful species since the days of the Woolhope Club (Thos. Hebden reported it from Cullingworth in 1905). *Cortinarius* (*Ino.*) *argentatus* is one of the additions to Yorkshire. This species has much the appearance of young *Agaricus arvensis*—in fact it was at first taken for that species.

A charming tuft consisting of about ten individuals of

Hypholoma leucotephrum, with their white, silky-fibrous, ring-encircled stems, and whitish, subcampanulate, radially-wrinkled caps, was found beneath a Rhododendron bush near Sandsend and brought to the schoolroom by H. Stonehouse, one of Lord Normanby's employees. This is not at all a common species, there being only one previous Yorkshire record.

Owing to the season being later, a few more Boleti than usual were seen, *Boletus piperatus* being one of the additions to the district records. These are due July to early September.

There were exceptions to the general scarcity. Quite a quantity of *Mycena hæmatopoda*, with its bleeding leg, was noticed on rotting stumps. One remarkable feature was the large number of pink-spored agarics—certainly greater than has been met with in these woods on any previous occasion. There were no fewer than nine species of *Entoloma—clypeatum, sinuatum, ameides, rhodopolium, speculum, etc.* There was also *Clitocybe carneoalbus*. The genus *Naucoria*, of the brown-spored group, was also much in evidence, including amongst others—*cerodes, pusiola, scolecina, erinacea, siparia, conpersa*, and *Wcislandri*—the latter new to Britain.

The group Gastromycetes was poorly represented, as were also the genera *Amanita, Lepiota, Pleurotus, Pholiota*, and *Cortinarius*. A collection of *Thelephoraceæ* was forwarded to Miss E. M. Wakefield, Kew, among which were *Corticium botryosum* (Trs. Brit. Myc. Soc., Vol. IV., Part 1 (May 1913, p. 117), new to Yorkshire. Not many Clavariaceæ were seen, the few gathered were sent to Mr. A. D. Cotton. No additions were made.

When two of the members returned to the schoolroom in the dark on Tuesday evening, a bright glow was seen on one of the tables. The light was found to arise from a phosphorescent fungus known as *Aldridgea sebacea*, formerly *Soppittiella sebacea*. It was taken to the house and placed in a dark corner to interest those who had not before seen it under those conditions.

Mr. Clarke brought to the meeting specimens of *Uredo tropaeoli* Desm., on leaves of Nasturtium, from his garden at Huddersfield.

Miss Massee brought a series of beautifully-executed drawings of the genus *Mycena*, delineating those the microstructure of which she has already investigated. There were also drawings by Mr. Gibb and the Secretary.

On Saturday Miss Massee gave a paper on 'The Genus Mycena,' and Mr. Wager, F.R.S., discoursed on 'The Structure of Fungi.'

On Monday Mr. Massee, Chairman of the Mycological Committee, gave a talk entitled 'Outlines of the Evolution of

the Basidiomycetes,' illustrated by the lantern, and Mr. Peck exhibited a large number of lantern slides of Yorkshire agarics.

On Tuesday Mr. Wager gave his observation on 'The Micro-chemical Selection of Aldehydes in Fungal Tissues,' illustrated by diagrams, and Mr. Gibbs the results of his long-continued observations on 'Fungus Habitats.'

Mr. Clarke read a paper on 'The Genus Hygrophorus,' dealing with their structure, consistency, classification, habitat, distribution, appearance, colours, and qualities—several being edible. In respect to other groups of agarics Mr. Clarke had gone to much trouble in preparing half a dozen large diagrams, each in the form of a synopsis after W. G. Smith, showing at a glance the arrangement of the genera in the several groups of agarics constituting the Agaricaceæ. The diagrams were hung on the school walls on the Monday morning and left there until Thursday for study, and proved very uesful.

Several visitors staying at Sandsend, also residents, expressed a wish to come into the school to see the fungi on the tables. Most of them spent some time in looking around, and were much surprised to see so great a variety, and richness in colour, displayed in this class of vegetation.

At the May meeting in the neighbourhood of Sandsend twenty-seven additions were made to the flora, four of which were new to Yorkshire, two of them being new to Britain—*Peniophora glebulosa*, on dead wood, and *Glœosporium trifolium* Peck, on *Trifolium repens*, the latter only previously known from the United States of America.

In September about sixty further additions were made, twenty-five of which were additions to Yorkshire and two new to Britain, viz., *Naucoria Weislandri* Fr., and *Galera flexipes* Karst. For May and September results see below.

On Wednesday a summary of the work already done in the district was given by the Secretary.

At the business meeting a hearty vote of thanks was passed to the Rev. the Marquis of Normanby for so kindly permitting the Mycological Committee to search the woodlands connected with Mulgrave Castle a few years in succession. Also to the Rev. W. G. Harland for granting the use of the schoolrooms at Sandsend.

The Committee and Officers for 1914 remain the same, with the exception of the omission of the name of the late James Needham and the addition of Miss Ivy Massee, Kew. Miss Massee and Mr. Bendorf, Manchester, were recommended for election as members of the Union.

The Members of the Committee are trusting to the generosity of Lord Normanby to once more allow them to look through Mulgrave Woods, and recommend Sandsend, 3rd to 8th October, as the meeting-place for 1914.

The additions to the district records in spring and autumn, 1913 are as follow :—

† New to Yorkshire. *† — New to Britain

May 3rd to 8th.

Entoloma ameides. Also in September.
Lenzites betulina. On birch stump.
Hydnum auriscalpium. On fallen fir-cones.
Corticium poligonium. On bark.
*†*Peniophora glebulosa.*
Melampsora cerasti. On *Cerastium arvense.*
Gymnosporangium clavariæforme. Teleutospores on *Juniperis communis* in garden at Sandsend.
Puccinia albescens. Teleutospores on *Adoxa moschatellina.*
—— *Baryi.* On *Brachypodium.*
—— *Bunii.* On *Conopodium denudatum.*
Cordyceps entomorhiza. On dead pupæ.
Lasionectria Rousseliana. On dead branches and leaves of box trees.
Diatrype quercina. On fallen oak-twigs.
Diatrype discoidea. On dead birch-twigs.
Valsa decedens. On dead fallen branches.
Cryptosphæria millepunctata. On young fallen ash-branches.
Capnodium sphærinum. In black patches on living leaves of *Veronica serpillifolia.*
Lophodermium Rhododendri. On dead leaves of Rhododendron
†*Morchella elata.*
Peziza venosa. On bare ground.
Dasyscypha fugiens.
†*Helotium Aspegrenii.* On chips.
—— *gramineum.* On dead grass.
Phoma rusci. On leaves of *Ruscus aculeatus.*
*†*Glæosporium trifolii.* On *Trifolium repens,* Sandsend.
Arthrobotrium atrum. On decaying herbaceous stem.

September 20th to 25th.

†*Lepiota sistrata.*
Tricholoma bufonium.
— *brevipes.*
†*Clitocybe alutacea.*
—— *gilva.*
tuba.
Collybia butyracea.
† var. *bibulosa.*
†—— *stridula.*
—— *clavus.*
Omphalia pyxidata.
—— *oniscus.*
—— *demissa.*
†—— *infumata.*
Pluteus umbrosus.
—— *nanus.*
† var. *lutescens.*
Clitopilus carneoalbus.
Inocybe geophylla.
† var. *violacea* Pat.
†*Hebeloma sinuosum.*
Flammula connisans.
Naucoria cerodes.
†—— *pusiola.*
—— *siparia.*
*†— *Weislandri* Fr.
*†*Galera flexipes* Karst.
Bolbitius flavidus.
—— *tener.*
Cortinarius (Phleg.) triumphans.
— (—) *decoloratus.*
†—— (*Ino.*) *argentatus.*
Hypholoma leucotephrum.
Hygrophorus melizeus.
Lactarius serifluus.
—— *subdulcis.*
† var. *concavus.*
†*Russula fingibilis.*
Boletus piperatus.
Poria mollusca.
Hydnum membranaceum.
†*Corticium botryosum.*
†*Peniophora longiospora.*
Cyphella dochmiospora.
†*Apyrenium lignatile.* On decaying pinewood.
Spongiospora scabies. On potatoes, in garden at Sandsend.
Dialonectria peziza.
Sordaria coprophila.
†*Helvella quepinoides.*
†*Hymaria maurilabra.*
Dasyocypha fuscescens.

Cenangium cerasi. On dead branch of cherry laurel.
Phyllosticta lappæ. On burdock.
Phoma auricaria.
Diplodia taxi.
Asteroma rosea.
Dinemasporium graminum. On dead grass.
†*Oospora candidula.* On damp rush-bottom chair in school.
†*Ramularia nivea.* On leaves of *Caltha palustris.*
†—— *pratensis.* On leaves of *Rumex acetosa.*
†—— *plantaginea.* On leaves of *Plantago lanceata.*
†*Ramularia primulae.* On leaves of *Primula vulgaris.*
—— *urticae.* On nettle leaves.
† *Verticillium buxi.* On dying leaves of box-tree.
Periconia nigrella. On dead grass-leaves.
†*Macrosporium brassicae.* On rotting cabbage-stalk.
Isaria arachnophila. On dead spider.
Fusarium brassicae. On rotting cabbage-stalk.
Physarum vivescens.

—:o:—

FLOWERING PLANTS.

The Red-Flowered 'Morning Glory.'—Mr. Mosley's pink-hued Colne Bank bine-weed (vide p. 400, November issue) is probably the American race, *incarnata* of Loudon's Encyclopædia, No. 2295, b. page 140, which is more correctly *C. americanus* Sims, vas. *fraterniflorus* Mackenzie and Bush (Gray, p. 671). This in lack of sight of specimen, is almost certainly the same thing as grows at Mirfield, where there has long been a large colony upon the rough Calder bank just above the Bridge. It was known to Lee for many years. I think it is not, there, intermingled with the cordate-leaved white race, dubbed 'native' too loosely, although rampant now in some 95 county-areas out of Britain's 112. The rose form has more hastate-angled leaves, is more or less pubescent, and has the peduncles and leaf stalks shorter, 'wing-angled' and with a curiously different twist—very much in evidence, this last, where the vine has to grapple low soft herbage, as at Mirfield where the 'yards' of the milns (through the hides or fleeces imported, it came there, no doubt) abut on the river bank. But neither the withershinstral twine, nor the halberd-angled contour of the leaves are stable 'characters.' In the view of morphology they are manœuvral in their nature—an adaptation to the compulsions of circumstance. Where the vine can climb trees, the flower stalks lengthen out, and the leaves 'grow' out in an ampler way. Situation, vicissitude often explains form. Mr. Mosley's Colne bank colony may be an out-throw from gardens, in which it is grown by unaware amateurs sometimes, usually to their ultimate disgust, since its 'devils-gut' roots go 'farther' and seldom 'fare worse' than those of any other arbourer. Its associates will generally show a botanist its origin.—F. A. Lees.

Naturalist.

YORKSHIRE NATURALISTS AT YORK.

THROUGH the kind invitation of the Yorkshire Philosophical Society, the members of the Union were enabled to hold their fifty-second Annual Meeting in the magnificent lecture theatre attached to the museum and presented to the inviting Society by the late Dr. Tempest Anderson.

During the morning many members availed themselves of the opportunity to visit Askam Bog, and, by the kind permission of Dr. A. H. Burtt, the grounds of the British Botanical Association.

The excellent attendance of members, and delegates of the affiliated societies (twenty-six of whom sent representatives to the meeting of the General Permanent Committee held in the afternoon) added a zest to the proceedings, as did also the statement by the Treasurer, Mr. E. Hawkesworth, on his presenting the Balance Sheet, that the debit balance had been so substantially reduced that the outstanding indebtedness of the Union was now only slightly over £8. The Annual Report, which was adopted, showed that the various sections still continued to do good work in furthering the advance of Yorkshire science. Hearty thanks were accorded to the various officials, and they were unanimously re-elected. The chair was occupied by the President, Mr. Harold Wager, F.R.S., F.L.S., who expressed the pleasure it gave him in making the announcement that the Executive had offered to Mr. Thomas Sheppard, F.G.S., F.S.A. (Scot.), of Hull, the presidency for the ensuing year, and that Mr. Sheppard had signified his acceptance, and the meeting voiced satisfaction thereat. In all probability the annual meeting of the Union for 1914 will be held at Leeds.

During the preliminary part of the evening meeting, which was also well attended, Mr. Wager occupied the chair, and after an epitome of the Annual Report had been presented by the secretaries, eleven new members were elected, and one Society was affiliated.

The Lord Mayor of York, Councillor Rhodes Brown, occupied the chair during the delivery of the address by Mr. Wager, who took for his subject 'The Movements of Micro-Organisms in response to external forces.' In masterly manner he dealt with his investigations of one of the flagellate Infusoria, *Euglena viridis*, showing fully how it made response to the actions of light and gravity, and that these responses were not due to mechanical means. Many excellent lantern slides helped to emphasise Mr. Wager's remarks. The address will be published in *The Naturalist*. The motion of thanks to Mr. Wager for his address, as well as for his excellent services to the Union during his term of office, was heartily agreed to. Thanks were also accorded to the Lord Mayor for presiding.

to the Yorkshire Philosophical Society for the use of the Hall, and hospitality, and to Mr. Oxley Grabham, M.A., and Mr. Wm. Ingham, B.A., for making the local arrangements.

The exhibits were numerous. They included the contents of the museum of the Yorkshire Philosophical Society, which contains one of the best collections of Roman remains in the Kingdom, housed in the Hospitium ; an excellent geological collection, a good collection of British Birds, including two specimens of the now extinct Great Auk ; The Allis collection of Lepidoptera ; the Hey collection of British Coleoptera ; a fine osteological collection, and many remains of prehistoric man. There was also a special exhibit by Mr. Ingham of marine algæ, lichens, hepatics, sphagna, true mosses, rare ferns, and club-mosses ; and of rare birds and waders by Messrs. C. Proctor and S. H. Smith. A large number of beautiful autochrome lantern slides depicting Irish scenery, mosses, fungi, and flowering plants was shown by Mr. C. A. Cheetham. Of the latter, those of the furze, fly orchis, globe flower at Malham, mountain avens at Arncliffe, and sweet cicely, were greatly admired. Lantern slides were also exhibited by Messrs. O. Grabham and S. H. Smith.—W. E. L. W.

We learn from *Nature* that ' a Conference of members of the Museums Association and others interested in Museum work was held at Warrington on 30th October, on the invitation of the Committee of the Municipal Museum. Representatives attended of the Museums of Liverpool, Manchester, Hull, Bolton, Salford, Leicester, Stoke-on-Trent, and other towns. Mr. P. Entwistle raised the question how far it was allowable to go in the restoration of imperfect specimens, maintaining the view, with which the meeting generally agreed, that such restoration as was required to give a clear impression of the form of the object was desirable, provided that the extent of the restoration was obvious on close examination. Dr. Tattersall (Manchester Museum), in a paper on museums and local collections, with the outlines of a scheme for the compilation of a fauna of Lancashire, said that the first duty of a provincial museum was to collect and preserve specimens illustrating the natural history of the surrounding district, and proposed that an organization should be formed to link up the existing museums in Lancashire with the various natural science societies, and specialists in various zoological groups. The museums would receive the specimens collected locally and forward them to appointed centres, where they would be named and recorded, and returned when dealt with to the same museums for permanent preservation.' Mr. Sheppard (Hull Museum) pointed out the way in which the records of the various Zoological Societies were made permanent, by the aid of the Yorkshire Naturalists' Union, and its publications, and suggested that Lancashire naturalists would do well to follow the example of their Yorkshire friends. ' A Committee was appointed, with Dr. Tattersall as Convener, to take the preliminary steps to carry out the scheme. Mr. Madeley (Warrington Museum) announced that it was proposed, provided a sufficient number of museums agreed to subscribe, to prepare and distribute a series of casts of say,, twenty typical British stone implements from the British Museum collections. The selection would be made by Sir Hercules Read, who had also kindly consented to prepare a description to accompany the casts.'

VERTEBRATE ZOOLOGY SECTION OF THE YORKSHIRE NATURALISTS' UNION.

Two Meetings were held at the Leeds Institute on November 15th, the President, Mr. H. B. Booth, in the Chair.

The Chairman referred to the great loss that Natural Science had sustained since the last Annual Meeting, in the death of Alfred Russel Wallace, and Dr. P. L. Sclater. The whole scientific world was still under the shadow of the tragic loss of Captain Scott and his party in the Antarctic, and although Scott laid no claim to the title of naturalist, he shewed deep interest in that study, and his appreciation of its value as an important factor in the education and development of character in the young.

The reports of the West and North Ridings were read by Mr. Riley Fortune, and that of the East Riding by Mr. E. W. Wade,

The meagre returns for the North Riding inadequately represented the result of the year's observations in that area, and arrangements were made for their improvement.

The co-operation of the Vertebrate Recorders of all the affiliated Societies of the Union, was also urged.

Mr. Hewitt observed that the birds on Bempton Cliffs had been for 3 years, and were still, on the decrease, and that Puffins, Guillemots and Razorbills were also suffering in other localities. Was this not due to excessive egg collecting by the "Climbers?" Mr. E. W. Wade strongly opposed this theory, as, he said, climbing was yearly becoming slacker, and some of the ground was never worked.

Mr. Rosse Butterfield referred to the Grouse disease, which, during 1913, had been so prevalent on some Yorkshire Moors, while on neighbouring ground the bags had been highly satisfactory, and birds in good condition. The only explanation he could advance was that the heavy rainfall of last year had left the breeding stock so reduced in stamina that the disease had made easy and rapid headway. Mr. T. Roose stated that on the Bolton Abbey shoot, the birds had been very patchy, some normally good ground being quite devoid of birds. Mr. Oxley Grabham had heard it stated that a bad sheep year meant a bad grouse year, and in several parts of North Yorkshire he had found this to hold good. He pointed out that bad weather resulted in malnutritious heather which could not but affect the vitality of the grouse. Professor Garstang suggested that the birds sent by Mr. Butterfield for examination, and found suffering from 'gapes' should have the parasite identified, as it would be of importance to know whether it was the same as that infesting the common fowl.

The Reports of the Wild Birds and Eggs Protection Acts Committee were presented by Mr. R. Fortune, and the 'Mammals, Reptiles, Amphibians and Fishes Committee,' by Mr. A. Whitaker.

The Wild Birds, etc., Committee was re-elected with the addition of Mr. Joshua Wilkinson, of Huddersfield, and the Mammals, etc., Committee was re-elected with the addition of Mr. H. B. Booth.

At the evening meeting Mr. H. Firth shewed a stuffed specimen of a strange Duck which had been shot at Creetland in February, 1913. The bird was pinioned, obviously an escape from some aviary, and, in the opinion of Mr. Crabham, one of the Far Eastern Teals.

Mr. A. Whittaker shewed a Grey Shrike shot near Barnsley on March 23rd, 1913.

Mr. Jasper Atkinson gave a short paper entitled 'The Blacktailed Godwit and a Camera.' Previous to his visit to Holland, the lecturer's acquaintance with this former member of our nesting avi-fauna was limited to the specimens in the gardens of the Zoological Society. Like

many of the waders its extermination in England resulted partly from the drainage of the fens, the ubiquitous egg collector, and the systematic netting of the adults for table purposes. The bird's reputation as a delicacy may be gauged from the statement by Pennant in 1766, that it was sold from 2s. 6d. to 5s. , a very considerable sum in those days. It bred regularly in this country up to about 1824, and occasionally up to the middle of the century, but now only visits us as a migrant. In photographing a nest and pair of birds at three yards' range, the lecturer had ample opportunity of thoroughly studying both appearance and habits of both sexes, and noted that along the top edge of the upper mandible, a strip of slate colour occurs, a detail not referred to in Ornithological text books.

Contrary to the experience of other bird photographers, the lecturer had no difficulty in erecting a tent in close proximity to the nest without unduly scaring the owners, in fact, when the strangeness of the erection had worn off, no extraordinary precautions had to be taken.

The graceful approach to the nest was commented upon—the caress of the male bird when he wished to take his turn on the eggs, by gently running his beak along his partner's back several times in succession, charmed the observer by its apparent affection and solicitude.

Mr. A. Whitaker gave a paper on 'Leisler's' or the 'Hairy-armed Bat.'

The distribution of Leisler's Bat in England, has hitherto been determined from records in three widely separated districts, the Avon Valley, Cheshire and West Riding of Yorkshire. (In Ireland, it is plentiful). This disparity and isolation of habitat led the lecturer to suspect its more general distribution and that observation would lead to a great extension of the areas.

When one considers that only about twenty reliable and energetic naturalists are dealing with the Bat family in the country, and that Leisler's in general appearance closely resembles the common Noctule, such a marked discrepancy of records is readily appreciated. Systematic observation would do much to increase our knowledge of the particular species and the lecturer had, during the year, seen on the Lincolnshire borders, several bats flying, which he had no doubt were Leisler's. Close comparison with the Noctule revealed marked distinctions, not apparent in casual observation. Leisler's is slightly less in wing expanse, measuring 12 inches against 13½ of the Noctule, but obviously this is only relative and cannot be safely applied to individual specimens.

Another distinction lies in the dentition of the incisor teeth, but the lecturer found a more reliable and easy method of identification by comparing the fur, every hair of Leisler's being paler towards the roots, whereas those of the Noctule are darker in that direction. In flight it would be found about the altitude of the tree tops—twice as high as the pipistrelle, but not so high as the Noctule.

Most of the book illustration depicting bats in flight were inaccurate, insomuch as his many attempts of photographing the animal in flight had never shewn the wings to reach above the level of the back, as in the case of birds, the tips however, almost or quite met in the down stroke. An exposure of 1 200 part of a second revealed only a blurred patch in the wing area, suggesting at least several wing beats in that time.

This species commences flight generally just after sunset on mild nights during Spring, Summer and Autumn, and continues for about 1½ to 2 hours only, re-emerging at dawn for a shorter period.

During summer the general rule is for the two sexes to separate and congregate in parties in the holes of trees. In Winter both sexes are found in mixed company in old buildings and tree holes.

This bat's wild activity in flight is in remarkable contrast to its lethargy during forty-nine fiftieths of its life. It hibernates from the end of November until early March in unbroken sleep.

Naturalist,

The lecturer was able to supplement our knowledge of the life history of Leisler's bat, by giving some particulars of its breeding habits, of which hitherto nothing was known. On June 25th of the present year, Woodcutters at Stainboro' felled an old oak tree, and during the succeeding dinner interval about a score bats were seen to escape from a hole, of the remainder, four specimens were caught—two adult females, each with one young clinging to it. One young one had probably been injured in the fall of the tree, as it died the same day, and one of the adults also succumbed a few days after. The two adults and one young were put in a cage where the young one lived four days quite unattended by either female, another proof of these creatures' unusual vitality. Both young were of a purplish flesh colour and naked of fur. They had about twenty milk teeth, the three central pairs of the upper jaw and two central pairs of the under jaw were developed, the remainder being scarcely visible. The developed teeth were used to seize hold of the adult wherever possible with a view of eventually taking refuge under the wing, where the young are usually carried. On July 4th, the remaining adult female, which was in a healthy condition, grew very restless about 2 o'clock, and on examining the cage at 4 o'clock, a newly born young one was found, but after a few days the mother neglected it completely. Nevertheless it lived until August 3rd—30 days, without shewing any development whatever.

The voracity of bats when meal worms were provided was illustrated by statistics of the number and weight consumed at a meal—each individual eating fully a quarter of its own weight.

Mr. Oxley Grabham delivered a short lecture on the ' Scarboro' Herring Fishery.' One side of this important industry—the innumerable barrels, the brawny armed Scotch lassies, and the red sailed smacks are a source of interest to visitors every summer holiday time. The old idea was the Herring came down from the North in shoals, which split at the northern extremity of an Islands, one party reaching as far as Lowestoft on the East Coast, whilst the other affected the Irish Sea and West Coast. These shoals were followed down by the Scotch boats, who, in addition to the local fisherman, were reinforced by Penzance boats.

The lecturer detailed the counting, gutting, salting, packing and dispatch to the Baltic and Germany, where practically all the catch is exported. Slides were shewn of the Herring and the Pilchard, which are sometimes confused. The Pilchard is thicker and shorter and carries larger scales, and if held by the back fin will preserve its balance, whereas the Herring will dip toward the fore part. Slides were also shewn of the Herring's enemies in the shapes of Dogfish, Toad Shark and Fox-tailed Shark—which also do great damage to the nets while attempting to extricate themselves.

The lecturer referred to the prevalent superstitions of the fishermen, who refuse to go out without a certain sheep bone* in their possession. A photograph of a Flounder taken in a Salmon Net near York, weighing $1\frac{1}{4}$ lbs. was shewn.

Professor Garstang, who had served on the recent Fisheries Commission, said their investigations had determined many local races of Herring, by the varied number of vertebrae. The shoals, therefore, did not migrate from the extreme North down to our East Coast, but the several races probably came up from deep water in succession.

Mr. R. Fortune had spent ' An afternoon with a pair of Arctic Terns and their young,' and with the help of a good series of the photographs taken, gave his observations then made. The birds were studied on the Farnes, and attention was called to the unrivalled range of the species, reaching from the Arctic Circle to the Antarctic Ice barrier on migration.

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* This is the hyoid bone, which is carried by many folks in Yorkshire and Lincolnshire for ' luck.'—Ed.

Unusual feeding habits were noticed, viz.:—The attendance of three adults to one young, also the feeding of a young Sandwich Tern by an adult Arctic Tern.

Mr. C. W. Mason shewed a series of slides of the Dotterel sitting.

Mr. Edmondson shewed a slide of the White-breasted, or Cape Cormorant, taken in the Zoo, and remarked on the similarity between this species and the variety on the Scillies.

Mr. Booth shewed slides of a rare bird from New Caledonia, the Kagu—now joined by a relative in the Zoo, also of the new Pigmy Hippo, and gave many particulars of their history and habits.

Votes of thanks were passed to the Lecturers and to Mr. Graham, of the Leeds Education Committee, for the use of the room.—A. Haigh-Lumby.

:o:

A former President of the Yorkshire Naturalists' Union, Mr. G. W. Lamplugh, F.R.S., has recently received the important post of Sub-Director of H.M. Geological Survey.

Mr. J. Wilfrid Jackson favours us with a copy of his Third Report of the explorations at Dog Holes, Warton Crag, Lancs., which deals with still further interesting discoveries in this cave.

Besides the study of the vertebrate fauna of the county, the Vertebrate Section of the Yorkshire Naturalists' Union seems to be doing good work in the way of securing new members for the Union, judging from the results of the recent meetings.

At the recent Annual Meeting of the Yorkshire Geological Society, Mr. R. H. Tiddeman, F.E.S., was nominated for presidency, and Mr. A. Gilligan for the sercetaryship, in place of Mr. Cosmo John, F.E.S., who was sincerely thanked for his past services.

We have received Vol. 2, Nos. 33 and 34 of the *Scientific Roll*, published by Dorrington Bros, London, at 2*s*., which contains pages 515-584, and includes abstracts of papers dating between 1800 and 1913, dealing with subjects connected with Vital Chemistry, Albumen to Alcohol.

The Third Annual Report of the *Doncaster Municipal Art Gallery and Museum* gives an account of the progress made at Beechfield. There is a commendable list of 'Bygones,' and a melancholy interest attaches to the gift of geological specimens by Mrs. Culpin. The insertion of a comma in the wrong place almost suggests that the Ammonites are from the Coal-measures.

We learn from the daily press 'that Reuter's Buenos Ayres correspondent says geologists from the La Plata Museum, who have been examining certain excavations which have been made at Mizanear, have made a sensational discovery of stone implements and various human objects. These are taken to prove that man already existed in the tertiary epoch.' Doubtless this will prove to be another case of comparatively modern remains being wrongly dated.

We take the following from a recent issue of *The Yorkshire Post*:—'An Antiquarian Find at Barton-on-Humber.—A very interesting antiquarian find has been made at Barton-on-Humber by some workmen in the employment of a cement manufacturing firm whose works are on the Humber side. They were engaged digging clay, about a quarter of a mile from the river, when they unearthed, some seven feet below the surface, the head and ribs of an animal which is *said to be unfamiliar to Great Britain*. Some of those who have seen the remains state that they resemble those of the walrus. Some time ago the perfect skeleton of a man measuring 6 feet 3 inches was found in the same part, and this is now in the Lincoln Museum. The present find is also to be sent to Lincoln.' We have had an opportunity of seeing this extraordinary discovery, and find that it is the skull of a young horse, and obviously quite modern in date. It has been sent to the Museum at Lincoln.

Naturalist,

A YEAR'S SCIENTIFIC WORK IN YORKSHIRE:

BEING

THE YORKSHIRE NATURALISTS' UNION'S FIFTY-SECOND ANNUAL REPORT,

FOR 1913.

(Presented at York 13th December, 1913).

THE FIFTY-FIRST ANNUAL MEETING, was held at Hull on Saturday, 14th December, 1912.

At the General Meeting Mr. John W. Taylor, of Leeds, delivered an address entitled "Dominancy and Phylogeny in Nature as affecting Distribution," which was well illustrated by a series of lantern slides. Afterwards a Conversazione was held at the Hull Museum, and the best thanks of the Union are due to the inviting Societies, the Hull Geological and the Hull Scientific Club, for their services in making the local arrangements, which contributed so much to the success of the Meeting, and to the Museums' Committee of the Hull Corporation for the use of the Museum. A full report of this Meeting appeared in *The Naturalist* for January, 1913.

The FIELD MEETINGS were six in number, full reports of which appeared in the pages of *The Naturalist*, and some had their value increased by illustrations. The Excursions were held as follows:—

Yorks., S.W.—Maltby, for Roche Abbey, Easter Saturday, 22nd March.
,, N.W.—Kirkby Stephen (Whit Week-end), 10th to 12th May.
,, Mid-West.—Burnsall, Saturday, 7th June.
,, S.E.—Stamford Bridge, Saturday, 5th July.
,, N.E.—Great Ayton (August Bank Holiday Week-end), 2nd to 4th August.
,, N.E.—Mycological Meeting, Sandsend for Mulgrave Woods, 20th to 24th September.

In addition, the Marine Biology Committee held its Annual Meeting at Filey from 29th August to 2nd September, and several other Sections have held successful gatherings during the autumn and winter months.

As in past years, Excursion Programmes have been printed and distributed prior to the Field Meetings.

The various landowners have readily granted the necessary permissions to visit their estates, and to them the best thanks of the Union are due, as well as to the Railway Companies for granting the usual cheap travelling facilities.

The Excursions for 1914 will be as follows:—

Yorks., Mid W.—Knaresborough (Easter Week-end), 11th to 13th April.
,, S.E.—Filey (Whit Week-end), May 30th to 1st June.
,, N.W.—Bainbridge, Saturday, 27th June.
,, N.E.—Whitby (for Glaisdale) (August Bank Holiday Week-end), 1st to 3rd August.
,, S.W.—Doncaster, Saturday, 19th September.
,, N.E.—Mycological Meeting, Sandsend for Mulgrave Woods, 3rd to 8th October.

Obituary.—The Union has to regret the loss of many of its ardent members. "In Memoriam" Notices of Henry Culpin, J. Conway Walter, James Needham, and Dr. Tempest Anderson have appeared in *The Naturalist*. The death of the Union's esteemed Treasurer, Mr. H. Culpin, of Doncaster, which occurred suddenly after the Annual Meeting in 1912, was deeply regretted. The Executive wishes to place on record their appreciation of Mr. Culpin's successful management of the Union's finances during the time he held office.

The Treasurer of the Union.—As successor to the late Mr. Culpin the Union was fortunate in obtaining the services of Mr. Edwin Hawkesworth.

Divisional Secretaries and Local Treasurers.—These gentlemen have again materially assisted the officials of the Union, and our thanks are due to them. They have been re-elected.

General Committee.—The following have been elected as members of the General Permanent Committee of the Union:—Mr. J. Beanland (Bradford), Mr. C. Bradshaw (Sheffield), Mr. J. Digby Firth (Leeds), Mr. J. A. Hargreaves (Scarborough), Mr. J. Hartshorn (Leyburn), and Mr. A. J. Stather (Hull).

VERTEBRATE SECTION.

West Riding Report.—Mr. Riley Fortune writes:—The year 1913 has probably been one of the most uneventful years on record. Summer migrants arrived about their usual dates, but in many instances left earlier. This was notably the case with Swifts, the scarcity of insect food being probably the cause. This scarcity at one period of the summer was very noticeable, many insectivorous birds were picked up dead and dying. Blackbirds, Thrushes, Starlings, and Hedge Sparrows suffered considerably.

Disease unfortunately appeared on many moors in the West Riding, and upon several of them the Grouse greatly suffered. Yet on adjacent moors good sport was experienced, and upon one of the best moors in the south of the Riding a record season was experienced.

Partridges suffered severely from the dry season, and coveys

in many parts were small. These birds appear to be losing ground almost every year.

In *The Naturalist* Mr. H. B. Booth records a decrease in the number of Starlings in Airedale and Wharfedale. Other observers in various parts of the county confirm this. In the Harrogate district it was not apparent at first, but very careful observation kept since Mr. Booth's note appeared certainly showed there is a decrease, but not a very large one. Mr. St. Quintin records cases of Starlings suffering from gapes at Scampston. Many records of unusual occurrences have appeared in *The Naturalist*.

THE EAST RIDING.—Mr. E. W. Wade writes:—The Long-eared Owl bred very sparingly again on our heavy clay lands, and at a later date than the average, seeming to confirm the writer's conjecture that continuous wet weather, by exterminating the mice, tends to restrict the fertility of this species.

The Turdidæ and Corvidæ were rather later in breeding than in 1912, the latter laying full clutches. A Redshank's nest was observed on 16th April containing four eggs—an early date for this part of the county.

Six swallows were observed near Driffield on 27th March, an exceptionally early date, the bulk of the species not appearing till 18th April. On 22nd and 27th April there was a rush of migrant Willow Warblers, and on 19th and 25th April of Yellow Wagtails. Swifts and Swallows were distinctly below the average. The Sedge-warbler has been unusually abundant. Reed-warblers had commenced laying on 20th May.

An exceptional feature of the season has been the scarcity of nesting Starlings, not more than ten per cent. of the usual numbers breeding. The birds were packing in large flocks by the third week of May, when they should have been busy feeding young.

Exhaustive inquiries as to the disappearance of the Corncrake show that, generally speaking, the scarcity of this bird dates back to a period eight to fifteen years ago. It shares with the Whinchat the distinction of being a vanishing race. There is strong reason for supposing that the Grey Wagtail and Grasshopper-warbler nested in Holderness. A pair of the former was observed frequently all the spring, and the latter was in song for three weeks.

Partridges have again been a disappointment. The young birds hatched well—a covey was observed as early as 20th May—but in most places dwindled down to very small numbers.

The Stone Curlew shows a slight increase in the protected area on the Wolds.

The Ringed Plover, as a result of the protection at Spurn, has extended its breeding range right up the coast.

In spite of the strictest watching, the Great Crested Grebe

on Hornsea Mere has only been observed to rear one brood of two young ones. After Mr. Bolam's report of five broods aggregating nineteen young in 1912, this is most disappointing. A bird was observed on Burton Constable lake on 24th March, the first ever recorded there.

At Bempton the egg-gathering has proceeded regularly, and a good harvest has been gathered in. The Peregrine Falcons reared two young in the old eyrie.

On 15th March a Little Auk was picked up dead in one of the timber yards in Hull. On 8th March Mr. F. Boyes reported several Waxwings at Beverley. Flocks of Bramblings were observed at Thearne on 6th April, and at Ferriby until 12th April. On 25th August two Bar-tailed Godwits and one young Ruff were observed at Hornsea Mere.

Messrs. Smith and Zimmerman record the nesting of the Pochard on Skipwith Common.

The North Riding.—Mr. T. H. Nelson reports:—The autumn migration has produced little of interest; the first flights of Woodcock took place early in Oct., on the 10th of which month I flushed one in my garden, and procured a very richly marked specimen on the Tees marshes next day. A few Brantlings, Short-eared Owls, Gold-crests, and the common migrants appeared as usual; and the second Woodcock flights arrived in the first week in November.

Mr. Thos. Stephenson has sent me information of a Little Bunting captured near Whitby on October 6th. This is the first record of this species for Yorkshire, and, therefore an addition to the County list.

Mammals, Reptiles, Amphibians, and Fishes Committee.—Mr. A. Whitaker writes:—Leisler's bat has been frequently observed in the Barnsley district, and a number of specimens procured at different times, the most important capture being that of two adults and two newly-born young on 25th June. Mr. H. B. Booth records the Common Field Vole (*M. agrestis*) from Malham Moors (1200 feet above sea level), at a much greater altitude than he had previously noted this species. A Grey Seal was reported from Whitby.

Mr. E. W. Wade reports that the Badger has been established at Brantingham Dale for the last four years.

Some interesting observations on the young of the Palmated Newt are being made by Mr. F. Rhodes, of Bradford. They are from eggs laid in a tank, and although the young are two years old they are still less than an inch in length and almost transparent, and a Flounder weighing 1 lb. 4 oz. was taken in one of the Salmon nets at Naburn Dam.

Mr. Grabham writes that several Salmon of between thirty and forty pounds weight have been netted in the Ouse near York.

Mr. W. J. Clarke furnishes some interesting records of marine

fishes, especially drawing attention to the unusual abundance of the Pout (*G. luscus*) and mentioning one specimen which measured sixteen inches and weighed 1 lb. 14 oz. after being gutted. The following also call for special mention: a Sea Lamprey (*P. marinus*) thirty inches long and over one and a half inches in circumference; a Three-bearded Rockling (*M. tricirrata*) sixteen and a half inches long; a Great Forked-beard (*P. blennioides*) twenty-one inches long and three pounds in weight, landed by a trawler on 10th May, and probably the first recorded for Yorkshire waters; an Æquoreal Pipe-fish (*N. æquoreus*) fifteen inches long, taken on 22nd May in a crab-pot near Robin Hood's Bay, and being the second recorded Yorkshire specimen; two Porbeagle Sharks (*L. cornubica*), taken in herring-nets off Scarborough on 9th August and 19th September, the one three feet and the other two feet in length. A Thresher Shark was reported from the neighbourhood of Whitby, but further confirmation of this record is desirable.

Wild Birds and Eggs Protection Committee.—Mr. Riley Fortune reports:—The amount received in Subscriptions for 1913 is £27 5s. 6d., which, together with the balance in hand and a sum of £2 provided for in last year's Balance Sheet and unspent, make a total fund of £54 1s. 4d. The expenditure amounts to £29 17s., leaving a balance in hand of £24 4s. 4d.

The birds at Spurn have had a good season, and many of the Lesser Tern have returned to the point to breed. Numbers were again nesting near the Beacon, and also in several places between the Beacon and the Point. It is unfortunate that during the nesting season Sunday excursion steamers bring large numbers of excursionists from Hull and Grimsby to Spurn who wander promiscuously about the Point, sometimes bringing dogs, and cause the watcher a good deal of anxiety. A pair of Oyster-catchers frequented the promontory, but the nest was not located. Redshanks again nested near Kilnsea, and Shellducks were in their usual numbers. Ring Plovers were, if anything, more numerous than usual. The Stone Curlews returned in their usual numbers, and successfully reared their broods. The Peregrines at Bempton were more successful in their nesting operations than last year. They reared two young ones.

At Hornsea, despite the dry season, the birds appear to have had a successful time. The Bearded Tits continue to do well, and the watching at Hornsea has been particularly effective.

The Committee has been successful in protecting a Peregrine's eyrie in the north-west fells. Three young were hatched and got safely away. This is particularly satisfactory, as it is very many years since the birds in the eyrie last reared a brood of young. Another brood nearly got away in a neighbouring valley, but the young were taken just before flying. We were.

however, successful in finding the person who took the young ones. Proceedings were taken against him, with the result that a fine was imposed and the birds confiscated and liberated. The magistrates stated that if any other cases appeared before them they would assist us by dealing severely with the offenders. Several other cases were dealt with, notably one at Bedale, where a man took some young Barn Owls and offered them for sale. Proceedings were taken, and he was fined and the birds confiscated. The magistrates in this case repeated the warning given in the first one.

It was reported that new keepers upon an estate which, owing to death, had recently changed owners, were destroying the Owls and Hawks. A letter from your Secretary to the owner, pointing out that these birds had always been protected upon the estate, speedily brought an order to the keepers that on no account were the birds to be disturbed.

These examples are sufficient to show that the Committee continues to do good work, and it hopes that any infringement of the Protection Acts coming under the notice of the members of the Union should be speedily reported.

Receipts for 1913.	£	s.	d.
Right Hon. C. G. Milnes Gaskell	10	0	0
W. H. St. Quintin, Esq.	5	0	0
T. Waddington, Esq.	2	2	0
J. Atkinson, Esq.	1	1	0
Dr. R. S. Bishop	1	0	0
H. B. Booth, Esq.	1	1	0
F. Edmondson, Esq.	0	10	0
Leonard Gaunt, Esq.	1	0	0
Oxley Grabham, Esq.	1	1	0
Riley Fortune, Esq.	0	10	6
Digby Ledgard, Esq.	0	10	6
A. Haigh-Lumby, Esq.	0	10	6
W. Denison Roebuck, Esq.	0	10	6
E. W. Wade, Esq.	0	10	6
York Field Naturalists' Society	0	10	6
Johnson Wilkinson, Esq.	0	7	6
Mrs. Bateman	0	5	0
W. H. Parkin, Esq.	0	5	0
Sidney H. Smith, Esq.	0	5	0
E. Wilfred Taylor, Esq.	0	5	0
	£27	5	6
Balance brought forward from 1912	24	15	10
Balance unpaid *re* Spurn	2	0	0
	£54	1	4

PAYMENTS FOR 1913.

	£	s.	d.
Wages, Hornsea	12	0	0
,, Spurn	12	0	0
Donation (*re* Bempton Peregrines)	1	0	0
,, (*re* Stone-Curlews)	1	0	0
,, (*re* Sedbergh Peregrines)	2	0	0
,, (Spurn)	1	1	0
Secretary's Expenses and Sundries	0	16	0
	£29	17	0
Balance in hand	24	4	4
	£54	1	4

CONCHOLOGICAL SECTION.

Mr. John F. Musham writes:—The work in this Section has again been ably maintained notwithstanding the dry summer, and excellent results have accrued (*vide* extended notices in *The Naturalist*).

Mr. W. Denison Roebuck and Mr. Greevz Fysher, for the rich district of Roche Abbey, reported thirty-two species.

Mr. Thomas Castle, in the Kirkby Stephen district, records twenty species and several slugs, water-shells being, however, scarce, and many species usually associated with a limestone district—notably the larger Helices—were conspicuous by their absence.

At Burnsall Mr. J. E. Crowther noted thirty-four species and four varieties for the Troller's Ghyll neighbourhood, dead shells of *Pomatia elegans* again being plentiful.

At and near Stamford Bridge Mr. Roebuck and Mr. Greevz Fysher, with the help of Dr. Fordham and Mr. Bellerby, turned up nineteen species in that portion of Division Yorks. S.E.

At Aldby-Bridge, crossing over in N.E. Yorks., four species were noted, and on the same side Mr. A. Smith observed twenty-one species.

Several of the commoner forms were observed at Great Ayton.

A new locality may be cited for *Paludestrina jenkinsi*, Dr. Corbett, of Doncaster, finding a large colony in the river at Brock-o-dale, Wentbridge, on 14th August, 1913.

MARINE BIOLOGY.—The Rev. F. H. Woods, B.D., writes:—The Annual Meeting of the Marine Biological Section was held at Filey this year. In spite of difficulties of weather and tides, a fairly thorough examination of the Brig and Spittal was made, and a microscopic examination of shell-sand obtained from Filey and Cayton Bay. This resulted in a considerable number of interesting finds, some new to the Yorkshire coast.

These are duly recorded in *The Naturalist* for October. It was decided to hold the next Annual Meeting at Whitby (18th to 22nd September would appear to be the most favourable time). The work at the Hull Museum has made steady progress during the year, ten more species having been added since December.

ENTOMOLOGICAL SECTION.

LEPIDOPTERA.—Messrs. A. Whitaker and B. Morley report:—All notes and information received confirm our opinion that the past season has been an exceptionally bad one for lepidopterists. Larvæ have been scarce, and "sugaring" has been very unproductive almost to the end of the season. In spite of the dry summer *P. brassicæ*, *P. rapæ*, and *P. napi* have been very scarce. *Vanessa atalanta*, however, has been unusually abundant in many districts during the autumn. *Colias edusa* was reported from Bridlington, Hull, and Spurn during September. Melanic *Phigalia pilosaria* were abundant in spring, and this form is unanimously spoken of as being on the increase. Four or five melanic specimens of *H. leucophearia* were taken in the Barnsley district. *Acronycta psi* was plentiful near Wakefield, a dark suffused form predominating. Black *Fidonia atomaria* were taken on the Meltham and Penistone moors. Wild larvæ of *Abraxas grossulariata* have produced var. *varleyata* at Barnsley and var. *nigrosparsata* at Huddersfield. A few black *Agrotis agathina* were bred from caterpillars found in the Skelmanthorpe district. Two species not previously recorded from Skelmanthorpe district have been taken in that neighbourhood, *i.e.*, *Eupithecia lariciata*, taken at Shepley by Dr. H. Douglas Smart, and *Orthosia macilenta*. The great abundance of *Plusia gamma* during September is worthy of note. With the advent of October, sugar, in the West Riding at least, began to have more attraction for moths, and at Skelmanthorpe, among the vast crowds of *Cerastis vaccinii* which came to it night after night, there were also taken a few specimens of *Agrotis saucia*, *A. suffusa*, *Cerastis spadicea*, *Calocampa exoleta*, and *Agriopis aprilina*—the latter of a bronze form. *Scopelosoma satellita* and *Phlogophora meticulosa* were both abundant. *Xanthia aurago* has occurred near Wakefield and Skelmanthorpe, and four specimens of *Aplecta occulta* were taken at 'sugar' at Wakefield.

COLEOPTERA COMMITTEE.—Mr. E. G. Bayford writes that the prolonged heat and drought which prevailed throughout the summer resulted in beetles, even the commonest species, being decidedly scarcer than usual.

During the year nineteen species have been added to the county list, while forty-eight species were new to the county division from which they were recorded. This result, while not as rich in novelties as last year's, is yet very far from

being uninteresting, and shows that the resources of the county are by no means exhausted. A full list will appear later. An article from the pen of the secretary, drawing attention to the inadequate recognition of the Committee's work in the recently published supplemental volume of "Fowler's Coleoptera" has been published in *The Naturalist*.

Hymenoptera, Diptera, and Hemiptera Committee.—Mr. W. Denison Roebuck reports that the Committee has received no information this season on any order but Hymenoptera. Observations on Aculeata have been made at Roundhay by Mr. A. E. Bradley, at Leeds by Mr. A. Hodgson and Mr. W. Denison Roebuck, at Keighley by Mr. Rosse Butterfield, at Luddenden and Halifax by Mr. H. Walsh, and at Selby by Mr. J. F. Musham. All agree that the season has not been very favourable, due to the unfavourable one of 1912. Of species of more than usual interest Mr. Walsh reports *Halictus gregyessneri* in plenty, *Crabro dimidiatus* and *Bombus jonellus* about Luddenden; Mr. Butterfield *Nomada ferruginata*, *N. lathburiana*, *Andrena helvola* and *A. analis* about Keighley, and Mr. Bradley has detected *Psithyrus quadricolor* at Roundhay. Of other groups Mr. W. E. L. Wattam sent *Sirex noctilio*, taken in Huddersfield, and Mr. B. Morley has bred the following parasitic Hymenoptera: at Skelmanthorpe *Pimpla alternans* from *Boarmia repandata*, *Stenichneumon trilineatus* from *Abraxas grossulariata*, *Macrocentrus infirmus* from *Dasypolia templi*, *Apanteles salebrosus* from *Pieris brassicæ*, and *Amblyteles palliatorius* from unknown host; at Normanton *Hemiteles similis*, hyperparasitic through an *Apanteles* from *Emmelesia alchemillata* and *Lissonota sulphurifera*, from *Dianthæcia carpophaga*; at Penistone Moors *Barylypa insidiator* from *Acronycta menyanthidis*; and at Doncaster *Microgaster connexus* from *Porthesia auriflua*. A further Yorkshire example of *Mutilla europæa* has occvrred on Low Moor between Scarborough and Robin Hood's Bay to Prof. A. G. Green. Some of the insects mentioned are new for Yorkshire.

Neuroptera and Orthoptera.—Mr. G. T. Porritt writes:—I have nothing of importance to record respecting the Neuroptera, as the season for them seems to have been as bad as it was with the other orders of insects. Everything of interest respecting captures has already appeared in the pages of *The Naturalist*. One marked circumstance has been the excessive scarcity of the Lacewing flies (*Chrysopidæ*). Of the local *Chrysopa tenella*, which some seasons is abundant in my garden, though looked for carefully, I did not see a single specimen either there or elsewhere. Indeed, I do not think I have seen half a dozen specimens of the genus the whole season.

I have not attempted to do anything among the Orthoptera in Yorkshire, and the only record I have is from Mr. E. G. Bayford, who had a specimen of *Periplaneta australasiæ* brought

to him by one of the stallholders in the Barnsley Market, which he thinks had been imported with bananas. The species has only previously been recorded from Halifax in our county.

ARACHNIDA.—Mr. William Falconer writes:—The work of investigating the Arachnida of the county has gone on steadily during the year, and satisfactory progress has been made. Members of the Committee have been present at several of the meetings, and lists of spiders obtained on two of these occasions have appeared in *The Naturalist* (May, pp. 207-8, and July, pp. 253-4). Although these do not contain any great rarity, they are valuable in so far as they are from districts not previously worked. The season has not been a good one, but three new species of spiders, all of them very rare, have been added to the county list (grand total now 317), viz., *Hahnia pusilla* C. L. Koch ♀, *Walckenæra capito* Westr. ♀, and *W. nodosa* Camb. ♀, taken by myself in the West Riding in June. Another interesting addition, with previously only one British record, is the var. *lantosquensis* Sim. of *Erigone atra* Bl., which I found on Spurn in May. Of the rarer members of our fauna the following have again occurred:—Collected by the Rev. R. A. Taylor, *Hahnia nava* Bl. (the first Yorkshire ♂), *Entelecava thorellii* Westr., *Sintula cornigera* Bl., *Chiracanthium carnifex* Fabr.; by Mr. Sanderson, *Micrommata virescens* Clerck.; by Mr. J. W. H. Harrison, *Phaulothrix hardii* Bl., *Notioscopus sarcinatus* Cb., *Hypselistes jacksonii* Cb.; by Mr. Winter, *Coryphæus distinctus* Sim.; by myself, *Sintula cornigera* Bl., *Gongylidiellum latebricola* Cb., *Maro falconerii* Jacks., *Maro minutus* Cb., *Diplocephalus protuberans* Cb., *Entelecara trifrons* Cb., and *Wideria fugax* Cb. Draining operations on Eston Moor may result in the disappearance there of *Notioscopus sarcinatus* Cb. and *Hypselistes florens* Cb., and dock extensions near Hull in the loss of *Erigone spinosa* Cb. from Saltend Common.

No new harvestmen have been seen, but *Nemastoma chrysomelas* Herm. has turned up in several parts of the county, while among the pseudoscorpions examples of *Chernes nodosus* Schr. (one from the North Riding) and *Chthonius tetrachelatus* Preyss. (several from the East and West Ridings) have been obtained.

County records for mites are practically nil, but during the year a number of them, which were in the first instance at least named by Dr. George, have been collected by Mr. Winter and myself, while the Rev. J. E. Hull, Ninebanks, Northumberland, has kindly supplied me with a list of Cleveland oribatids.

BOTANICAL SECTION.

Mr. J. F. Robinson writes:—Some of the older plants, dear to the hearts of the so-called "floristic" school of botanists, have turned up again at the various Field Meetings. For example, *Helleborus viridis*, near Roche Abbey, and *Thalictrum minus*, var.

montanum; *Trollius europæus* and, *Galium sylvestre* at the Burnsall excursions *Hypericum elodes* and, quite remarkable and interesting to state, *Lycopodium annotinum* still linger in the Buttercrambe Woods (Stamford Bridge). Of the last-named plant it may be said that the late B. B. Le Tall, M.A., was the original discoverer in the East Riding district (1890). A manuscript note in the present writer's 'working' copy of the Flora of the East Riding of Yorkshire, communicated by Mr. W. Whitwell, formerly of York, states this fact, but a subsequent note from Mr. Whitwell advises the deletion of the record as 'an error.' Now, the meeting of the Union at Stamford Bridge in July, 1913, re-establishes the species in our area!

Apart from the Reports of Field Meetings, it is noted that some new things like *Peucedanum palustre* (Mr. George Bolam at Hornsea Mere) and *Carex paradoxa* (Mr. W. E. L. Wattam in a marshy place on Flamborough Headland, 1912) extend the number of records for the East Riding, although it may be noted that careful search for both of the above during the past season has not been rewarded with confirmation.

Utricularia ochroleuca Hartm. (*vide* Mr. A. Bennett) from Strensall Common (late George Stabler *legit.*) is a species new to Yorkshire.

Orobanche reticulata, var. *procera*, a species added to the British list in 1907, has been confirmed as reappearing in its original locality, by Mr. A. E. Bradley, on the roots of *Cirsium eriophorum*, who also reminds us that 'the tiny Yellow Rattle with brownish flowers'—*Rhinanthus monticola* Druce—is this year a first identification.

Mr. C. A. Cheetham adds:—The past year has provided botanists with many interesting questions. After the previous year's wet we scarcely hoped for much of a floral display, and consequently expected a lack of fruit. The Hawthorn, Elm and Hazel occur as examples quite in accord with this view, but the Ash and Rose have had abundant fruit, and, curiously enough, last year it was the reverse, *i.e.*, Elm and Hawthorn full fruit, Ash very little. The dry summer had the unexpected effect of making the Bramble harvest some weeks later than last year, and the fruit of a much inferior quality.

Mr. A. E. Bradley informs me that he has gathered various hybrid Willows of the 'Phylicifoliæ' group in Littondale and Langstrothdale. The Rev. E. F. Linton identifies among them *S. phylicifolia* × *nigricans*, *S. phylicifolia* × *cinera* (a different hybrid from the '*laurina*,' which is also said to occur), and a complex hybrid containing *S. phylicifolia*, *nigricans*, and *aurita*, with (possibly) *cinerea*. This last is a very handsome plant, with large dark glossy leaves and enormous stipules. It is a curious fact that hybrids containing *S. nigricans* are decidedly more frequent than that species in its 'pure' state.

Botanical Survey Committee.—Dr. T. W. Woodhead writes:—There are many items of interest to record relating to Botanical Survey in Yorkshire. The small Vegetation Committee which was founded in 1904 by Dr. Wm. G. Smith has developed into the 'British Ecological Society,' with a publication, the 'Journal of Ecology.' During the year two important works have appeared, viz., Mr. F. Elgee's 'Moorlands of North-Eastern Yorkshire,' which is a valuable contribution to our knowledge of the Cleveland Moors, and Dr. C. E. Moss's 'Vegetation of the Peak District,' which includes a small portion of South-west Yorkshire and gives an excellent summary of the plant associations of the area. It is indispensible to Yorkshire ecologists. Noteworthy contributions have also been made by Mr. W. B. Crump on methods of determining the water content of soils, in which he deals especially with the moorland and woodland soils of South-west Yorkshire. Reference to these, and comments on them by Mr. J. W. H. Johnson, will be found in *The Naturalist*, pp. 169-171, 239-241 and 436-438. An account of the Marsh Vegetation of Askern Bog and Kilham Marsh, by Mr. H. H. Corbett, appeared in *The Naturalist* for December.

Interesting observations have been made at the Union's excursions, notably at Kirkby Stephen (*Nat.*, page 232) and at Great Ayton (*Nat.*, pp. 326-7).

Members of the Heckmondwike Society are engaged on a study of the woodland vegetation of Upper Lodge Range, Hunsworth, and several maps have been prepared showing the distribution of the more important species.

Bryological Committee.—Mr. W. Ingham, B.A., writes:—Much good and successful work has been done during the year. Mr. James Murray has added *Ulota phyllantha* to Cumberland. Mr. R. Barnes has re-found the very rare moss *Oreas Mielichoferi* var. *elongata* in the original locality in Cleveland. The only other locality for this moss in the British Isles is South Aberdeen, where it was refound by Mr. W. E. Nicholson in July, 1912.

Mr. J. J. Marshall has added the following to North Lincolnshire: *Seligeria calcarea*, *Tortula angustata*, *Trichostomum flavovirens*, *Webera annotina* var. *bulbifera* c. fr., the first British record in fruit of this var., *Brachythecium rivulare*, *Eurhynchium pumilum* c. fr., *Amblystegium Kochii* c. fr., and *Hypnum giganteum*, the last also by J. F. Musham.

Mr. C. A. Cheetham has added *Webera proligera* to Mid-west Yorks.; Mr. W. Watson *Funaria Templetoni* to South-west Yorks., and Mr. W. Ingham *Philonotis capillaris* to Yorkshire—good 'capillaris.' He also found good *Bryum capillare* var. *elegans* on Ingleborough.

Mycological Committee.—Mr. C. Crossland writes:—In April the sixth instalment of 'Newly-discovered Fungi in York-

shire,' since the publication of the Flora appeared in *The Naturalist*. This consisted of fifty-five species, fifteen of which were new to the British flora. The county fungus flora then stood at 2,950.

It will be seen by the reports of the various excursions published in *The Naturalist* that the mycologists were active in their searches. There is no need for particulars here, as they may all be found in the following pages of our journal:—Roche Abbey, pp. 208-9; Kirkby Stephen, 234; Burnsall, 374; Stamford Bridge, 302-3; Great Ayton, 329-31. A new departure may be noted. At Burnsall Mr. F. A. Mason, Leeds, exposed some prepared plates with the object of catching fungus spores floating in the atmosphere, and succeeded in developing, among other of his captures, four species not previously recorded in the Yorkshire Fungus Flora.

The mysterious discomycete *Phœangella empetri*, which grows on browned leaves of *Empetrum nigrum*, and has been in three different genera, has at last been clearly and satisfactorily defined. (*See The Naturalist*, 1912, pp. 206-7, and 1913, pp. 251-2.)

In June, *Humaria subhirsuta*, an interesting and uncommon discomycete, was sent me by Mr. Sheppard. It was found growing in a shaded corner of his garden at Bridlington.

The Keighley Natural History Society sent one of the Mycetozoa, *Chondrioderma simplex*, on dead ling from the moors between Cowling and Keighley in July. This is the first record for the species in England.

By the death of Mr. James Needham, Hebden Bridge, the Committee have lost a valuable member.

An informal meeting was held by the Committee in May at Sandsend for the Mulgrave district. The annual foray in September was again held in the same district. The results of the two meetings, which were considered most satisfactory, will be duly chronicled in *The Naturalist*. There was a general feeling at the close that it was necessary to continue our researches a little longer, by permission of the Marquis of Normanby, so as to get an approximate idea of what a given area will produce.

GEOLOGICAL SECTION.

Messrs. J. Holmes and C. Bradshaw, report as follows:—All the Committees of the Section, except that dealing with Coast Erosion, had opportunities for practical work at the excursions. Most of these meetings were well attended, the one held at Burnsall, at which nearly forty members were present, being particularly good. On Easter Saturday Roche Abbey was visited, when the geologists renewed their acquaintance with

the characteristic Magnesian Limestone of the district, and enjoyed the privilege of gleaning coal fossils from the Maltby Main Colliery spoil heaps, despite the wet weather.

During Whitsun Week-end an extensive tract of country near the head of Swaledale was explored, and on this occasion special attention was given to the brecciated conglomerate locally known as Brockram, a rock which occurs at the base of the Permians, and is well developed about Kirkby Stephen.

The Burnsall meeting was mainly devoted to a study of the Tournaisian beds at Hetton and Winterburn, and the Viséan beds at Rylstone and Cracoe Gill. Characteristic fossils were obtained at all these places, and at the latter was observed the reef knoll structure for which the limestones of the locality are famous.

At Stamford Bridge glacial geology was the attraction. Interesting sections in gravel pits of the vale of York terminal moraine were examined, and travelled rocks from distant sources noted.

The chief geological features of the August Bank Holiday gathering at Great Ayton were the Cleveland Whin Dyke, especially at points where its effects upon contiguous Lias strata are to be seen, and the Estuarine beds of the main escarpment of the Lower Oolites, together with those forming the outlier on the summit of Roseberry Topping. These latter included an interesting plant bed which it is now possible to explore owing to a remarkable landslide that has recently taken place.

Excellent accounts of the meetings have appeared in *The Naturalist*, and thanks are due to Dr. Wilmore, Mr. J. W. Stather, and Mr. J. J. Burton, who acted as leaders and contributed reports.

Coast Erosion Committee.—Mr. J. W. Stather reports that Mr. Lionel Walmsley has an interesting paper in *The Naturalist* on the denudation of the cliffs immediately south of Bay Town, Robin Hood's Bay. He says:—"Assisted by the water from the fields above and from the springs, the cliff proper resembles a tremendous chute, delivering excellent agricultural land into the sea at the rate of many square yards per year."

Mr. J. T. Sewell, J.P., of Whitby, sends some interesting notes respecting the denudation of the cliffs and shore near Whitby. He states that an old painting of Whitby, dated 1775, shows an undercliff immediately west of the Coastguard Station, near the pier, and it was of sufficient area for fairs, etc., to be held upon it. This undercliff, however, had disappeared in 1840, for at that date the cliffs rose perpendicularly from the sands as at present. During the years 1860 to 1868 the jet rock, which formed the surface of the foreshore opposite Sandsend, was artificially removed to the extent of ten to seventeen feet

in depth. The disappearance of this natural breakwater was, in his opinion, the cause of the serious coast denudation which had occurred in the Whitby Bay during recent years, especially in the neighbourhood of Rathwaite and Upgang.

Jurassic Flora Committee.—Mr. J. J. Burton writes:—Members of the Committee have had one week-end meeting at Gristhorpe and Cloughton, when they had the advantage of the guidance and knowledge of Mr. H. Hamshaw Thomas, of Cambridge. During the spring and summer also many visits have been paid to the escarpments running round from Guisborough to the Kildale Valley and to the very important plant-bed of Roseberry Topping. So far as present investigations have revealed, the beds to the south of Roseberry are poor in plants, but in many places to the east on the main escarpment plant remains exist in considerable quantities, although the varieties found are so far not very numerous. To the north, on the Normanby escarpments, plant impressions have been found in the shales and sandstones of the estuarine beds, and this area will be further investigated in the hope that it may yield some new species. A preliminary notice of the plant beds of Roseberry Topping was given in *The Naturalist* for May last. Very large quantities of material from the Cleveland area have been sent to Cambridge, and are under investigation by Professor Seward and Mr. Thomas.

Glacial Committee.—Mr. J. W. Stather informs us that Mr. E. E. Gregory, Darlington, reports:—'Bones and antlers of the Red Deer have recently been found in the Post-Glacial Gravels about one mile south of Darlington. Work is being done among the Glacial clays, sands, and boulders of Teesdale and the valley of the Skerne, and the Glacial and Post-Glacial lakes in the same neighbourhood are receiving attention.'

Mr. T. Sheppard, writes:—'Excavations continue to be made in the Gravel beds at Burstwick and Kelsey Hill, in Holderness. In the latter pit enormous quantities of material have been removed, and have revealed many interesting mammalian remains, including the bones of a seal, which is the first record for that species from the Holderness Gravels. In connection with the widening of the North Eastern Railway Company's line on the north Humber shore, west of Hessle Station, a long section has been exposed showing boulder clay resting upon angular chalk Gravel, of a similar nature to that described by Philips, Walton, and the present writer, a little to the east of the present exposure.'

Micro-Botany and Micro-Zoology Committee.—Mr. J. W. H. Johnson, B.Sc., F.L.S., writes:—The work of this Section has been actively continued by the members, and much valuable

work is being carried out regarding the life history and distribution of our micro-flora and -fauna. We have to record with regret the death of Mr. H. G. Brierley, of Huddersfield, an ardent microscopist and photo-micrographer.

The Affiliated Societies.—The number of these Societies is now thirty-nine, having a total membership, calculated from the furnished returns from such Societies, of 3033.

The Membership of the Union now stands at 376. The following new members and Societies have joined during the year :—

Mr. J. Beanland, 55 Oulton Terrace, Horton Road, Bradford.
Lady Carlisle, Boothby Manor House, Brampton, Cumberland.
Mr. Harold E. Dudley, 137 Frodingham Road, Scunthorpe, Lincs.
Mrs. H. E. Dudley, 137 Frodingham Road, Scunthorpe, Lincs.
Mr. Richard Elmhirst, F.L.S., Supt. Marine Biological Station, Keppel Pier, Millport, N.B.
Mr. Greevz Fysher, 78 Chapel Allerton Terrace, Leeds.
Mr. Albert Gilligan, B.Sc., F.G.S., The University, Leeds.
Mr. Thomas Hebden, Hainworth Lane, Keighley.
Mrs. B. W. Hoggett, 7 Hillary Place, Leeds.
Mr. Edmund G. Highfield, B.Sc., 36 Potter Hill, Pickering.
Mr. W. A. Millard, B.Sc., The University, Leeds.
Mr. C. F. Markham, B.A., 8 South Parade, York.
Rev. George E. Park, B.A., Burton Fleming Vicarage, Hunmanby, S.O., Yorks.
Mr. T. W. Wilshaw, 210 Myrtle Road, Heeley, Sheffield.
Mr. Lionel Walmsley, The Studio, Robin Hood's Bay.
Mr. E. R. Wethey, M.A., F.C.S., 4 Cunliffe Villas, Manningham, Bradford.
Birmingham Natural History and Philosophical Society.
Selby Scientific Society.

Winter Lecture Scheme.—The revised List of Lectures has been printed and circulated to the affiliated Societies.

Transactions.—The Union will issue to Members early in 1914 a further volume of Transactions, comprising Mr. John W. Taylor's Presidential Address for 1912 on 'Dominancy and Phylogeny in Nature as affecting Distribution,' which is illustrated by coloured maps; the Excursion Programmes from 1909 to 1913, and a List of Members of the Union as at the end of 1911 (kindly presented by Mr. Sheppard).

Soppitt Memorial Library.—We have to thank Mr. Chas. Crossland for reprints of the papers dealing with Yorkshire Fungi which have appeared during the year. Mr. T. Sheppard has kindly presented to the Library a copy of C. B. Plowright's 'Monograph of the British Uredineæ and Ustilagineæ.'

British Association.—Mr. T. Sheppard reports that he attended the Conference of Delegates of Corresponding Societies at the British Association, and, with the help of Mr. W. West and others, effectively negatived a proposal to give landowners and others powers and suggestions which would materially interfere with the work of Natural History Societies. The discussion was fully dealt with in the 'Notes and Comments' column of *The Naturalist* for October.

The Naturalist.—*The Naturalist* has maintained its high standard of excellence during the year. Some of the papers published place on record the results of important researches; many of the articles have afforded pleasant and profitable reading to the lover of Nature; the Editorial comments on various matters have at times added a little zest, while the reports of the Union's excursions, the numerous short notes, and the reviews are of considerable value to the reader.

Phenological Observations.—The Royal Metorological Society has appealed to the Union to aid them in obtaining yearly a series of observations on certain plants, birds, and insects, and the Executive hope that members of the affiliated Societies will assist by filling in and returning the required notes on the form issued by the Society.

The Presidency for 1914 has been offered to and accepted by Mr. Thomas Sheppard, F.G.S., F.S.A. (Scot.), whose scientific attainments in geological research and sterling services as Secretary of the Union for nine years, and in connection with *The Naturalist*, are so widely known and appreciated.

The Union wishes to record its great indebtedness to its retiring President, Mr. Harold Wager, F.R.S., F.L.S., of Leeds, for his untiring zeal in promoting the welfare of the Union during the year, and also for his attendance at the excursions and sectional gatherings, which has been greatly appreciated.

Financial Statement. — The following is the Hon. Treasurer's (Mr. Edwin Hawkesworth) Statement of Receipts and Payments:—

INCOME AND EXPENDITURE STATEMENT, 12 months to November 30, 1913.

INCOME.

	£ s. d.	£ s. d.
Members' Annual Subscriptions, 1911	2 13 0	
,, 1912	7 19 6	
,, 1913	100 17 0	
,, 1914	1 18 6	
		113 8 0
Levies from Associated Societies, arrears	3 0 0	
,, 1913	11 14 2	
,, 1914	0 3 3	
		14 17 5
Life Members' Subscriptions (*contra*)		7 7 0
Sales of Publications—		
Baker's 'North Yorkshire'	0 11 3	
Porritt's 'Lepidoptera'	0 9 8	
'British Arachnida'	0 2 0	
Transactions	0 7 6	
'Natural History of Hornsea Mere'	1 0 3	
		2 10 8
Bank Interest		2 1 0
'Naturalist'—	£ s. d.	
Subscriptions, including £1 15s. for 1914	102 2 0	
Recognition fee	5 0 0	
Discount	1 5 0	
		108 7 0
		£248 11 1

EXPENDITURE.

	£ s. d.	£ s. d.
Expenses of Meetings		7 19 3
Printing and Stationery (General A/c)		21 6 0
Postages, etc. (Hon. Secretaries' A/c)		13 18 4
Clerkage, ,, ,,		10 0 0
Printing and Stationery (Hon. Treasurer's Account)		0 14 6
Postages etc., ,,		1 11 9
Wreath (Mr. Culpin)		1 1 0
Cost of Publications:—		
Annual Report, 1912	£9 11 6	
,, ,, 1913 (est.)	6 0 0	
	15 11 6	
Less—Provision in A/cs for 1912	6 0 0	
	9 11 6	
'Natural History of Hornsea Mere'	2 5 0	
		11 16 6
Life Members' Subscriptions (*contra*)		7 7 0
'Naturalist'		
Subscribers' Copies	£97 9 2	
Life Members' Copies	6 15 0	
Exchanges	2 15 0	
Sundries	4 6 10	
Postages	7 1 10	
		118 7 10
Balance, being excess of Income over Expenditure during 1913		54 8 11
		£248 11 1

BALANCE SHEET, November 30, 1913.

LIABILITIES.

	£ s. d.	£ s d
Amounts due from Union—		
'Naturalist'	51 8 0	
Annual Report, 1912	9 11 6	
Sundries (Printing, etc.)	2 7 6	
	63 7 0	
Annual Report, 1913 (estimate)	6 0 0	
Subscriptions received in advance	3 16 9	
Life Members' Account	53 5 0	
'Hey' Legacy Account	20 0 0	
		£146 8 9

Audited and found correct,

JNO. W. STATHER,
J. FRASER ROBINSON.

8 12 1913.

ASSETS.

	£ s. d.	£ s. d.
Cash at Bank	122 9 0	
Cash with Hon. Secretaries	1 2 9	
Cash with Hon. Treasurer	4 1 8	
	127 13 5	
Less: Cash due to Hon. Editor	4 10 1	
		123 3 4
Subscriptions in Arrears	29 8 8	
Less: Amount written off as unrealisable	13 19 1	
		15 9 7
Balance, being excess of Liabilities over Assets, Nov. 30th, 1912	63 4 9	
Less: Income in excess of Expenditure during 1913	54 8 11	
		8 15 10
		£146 8 9

The Gannet feeding young.

(From a photograph by J. M. Campbell reproduced from 'The Gannet' by J. H. Gurney).

NOTES AND COMMENTS.

THE CAMBRIDGE SHILLING MANUALS.

The Cambridge University Press continues to publish its wonderfully cheap shilling Manuals of Science and Literature. The latest we have received are on the Flea, by H. Russell, which deals with *the* flea and others ; a charming and much needed ' Life Story of Insects,' by Professor G. H. Carpenter ; and a useful monograph on Pearls, by W. J. Dakin, which deals fully with the life history, origin, etc., of these objects. Each volume is quite unique in its way, contains about 140 pages, and is well illustrated and well bound. Naturalists are indeed grateful to the Cambridge Press for enabling these works to be obtained at so reasonable a figure.

THE GANNET.*

There can be no question that great strides are being made in the scientific study of birds, and a few years ago it would have been little anticipated that a volume of nearly 600 pages would be devoted to a discussion of one species. However, such being the case, we are not surprised that the author is Mr. J. H. Gurney, and the publishers, Messrs. Witherby and Co., who have produced so many important ornithological works in recent years. Whether dealing with the Gannet historically, from prior to the sixteenth century, its geographical distribution, nesting sites, life history, its economic uses, plumage, or osteological or anatomical characters, or even its parasites, the volume is surely the last word. While there is nothing but praise generally for the thorough way in which the book has been written, most ornithologists will marvel at the vast amount of information the author has been able to gather together in reference to the bird's early history. There is no padding, every sentence is of value ; the illustrations are perfect ; we are permitted to reproduce one (plate I.).

THE YORK MUSEUM.

As we have more than once expressed in these columns, the collections in the Museum at York are worthy of more suitable accommodation than they have at present, though doubtless the resources of the Yorkshire Philosophical Society have not permitted this. The announcement has been made that by the will of the late Tempest Anderson, the Society will receive about £50,000, a princely sum, which will doubtless enable it to make many needful changes and additions. We understand a further £20,000 has been left to the Percy Sladen Memorial Fund, established by Mrs. Sladen in 1904.

*pp. lii. + 567. 27s. 6d.

A NEW 'ZITTEL.'

Zoologists and geologists and many others will welcome a new edition of Zittel's well-known Text-book of Palaeontology, the first volume of which has just appeared from the house of Macmillan*, edited by the Curator of the Carnegie Museum at Pittsburg, Professor C. R. Eastman, with the assistance of a formidable staff of specialists. As to the precise nature of Zittel we feel it unnecessary to go into detail with readers of *The Naturalist*; there can be few naturalists who are not familiar with it. All we can say with regard to the present volume is that it is quite on Zittel's lines, but has been thoroughly brought up-to-date, while the wealth of illustrations is surely extraordinary, there being 1,600 carefully drawn figures. Messrs. Macmillan deserve the thanks of all scientists for their interest in this work.

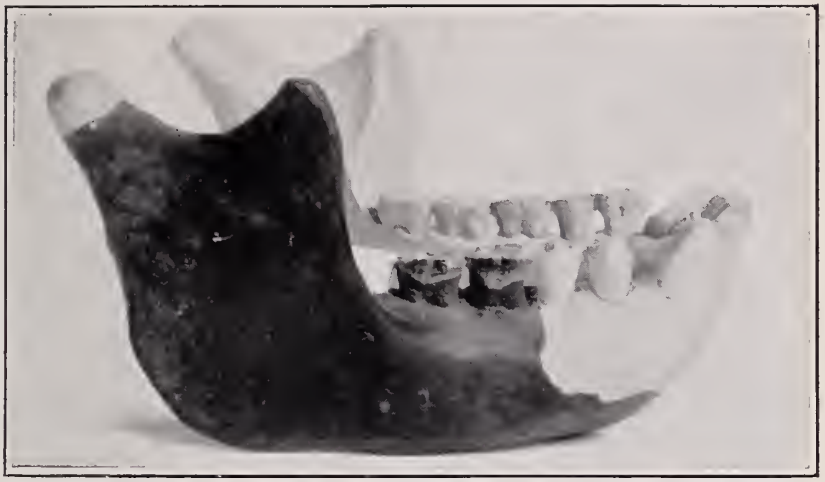
THE PILTDOWN SKULL.†

In view of the interest that has been aroused with regard to the human remains from Piltdown, Sussex, which are in all probability the oldest traces of man known, we are glad to notice that Mr. C. Dawson has recently made a further important contribution to the Geological Society. Though one is inclined to be sceptical with regard to any 'oldest' remains, especially in view of *some* recent discoveries, it must be admitted that at the British Association Meeting at Birmingham, the evidence certainly seemed to be in favour of the views as put forward by Dr. Smith Woodward. Since then that gentleman has kindly permitted us to handle and carefully examine the actual specimens, which has resulted in our being entirely converted to his views.

RECENT WORK.

Mr. Dawson says:—'The gravel at Piltdown, below the surface soil is divided into three distinct beds.'—The first, or uppermost, contains subangular flints and "eoliths," and one palæolith was discovered there *in situ*. The second is a very dark bed, composed of ironstone and sub-angular flints. All the fossils so far found in the pit have been discovered in, or traced to, this bed, with the exception of the remains of deer. A cast of a Chalk fossil, *Echinocorys vulgaris*, from the Zone of *Micraster cor-testudinarium*, occurred as a pebble. The third bed was recognized only in 1913, and consists of reconstructed material from the underlying Wealden rock (Hastings Series). It is only about 8 inches thick, and contains very big flints (8 to 15 inches long) which have been little rolled, and are not striated. They are saturated with iron, and have under-

* Vol. I. pp., xii.—839. 25s. net.
† See plate II.



The Piltdown Jaw as restored by Dr. A. Smith-Woodward.

As restored by Prof. Keith.

gone considerable chemical change. They differ very markedly in appearance from the smaller flints in the upper strata. No implements, "coliths," or fossil bones have been met with in this bed.

THE GRAVEL FLOOR.

The floor of the gravel, where the remains of *Eoanthropus* were discovered, has been carefully exposed, and many irregularities and depressions have been found to exist. In some of these depressions small patches of the dark overlying bed remained, and new specimens were discovered. The finds made this year are few but important, and include the nasal bones, and a canine tooth of *Eoanthropus* discovered by Father P. Teilhard de Chardin; also a fragment of a molar of *Stegodon* and another of *Rhinoceros*; an incisor and broken ramus of Beaver (*Castor fiber*); a worked flint from the dark bed; and a palæolithic implement from the debris in the pit. It will be noted that the remains are those of a land fauna only. The further occurrence of bedded flint-bearing gravels in the vicinity of the pit is noted. The authors' former conclusions, as to the Pliocene forms having been derived, are maintained.

CRANIUM OF EOANTHROPUS.

A further study of the cranium of *Eoanthropus* shows that the occipital and right parietal bones need slight readjustment in the reconstruction, but the result does not alter essentially any of the conclusions already published. The nasal bones, now described, are typically human, but relatively small and broad, resembling those of some of the existing Melanesian and African races. The right lower canine tooth may be regarded as belonging to the imperfect mandibular ramus already described. It is relatively large and stout, and, like the molar teeth, it has been much worn by mastication. The worn surface on the inner aspect extends down to the gum, and proves that the upper and lower canines completely interlocked, as in apes. In shape, the canine resembles the milk-canine of man and that of the apes more closely than it agrees with the permanent canine of any known ape. In accordance with a well-known palæontological law, it therefore approaches the canine of the hypothetical Tertiary Anthropoids more nearly than any corresponding tooth hitherto found.

PROF. ELLIOT SMITH.

In a note appended to the paper, Professor Elliot Smith points out that the presence of the anterior extremity of the sagittal suture, which hitherto had escaped attention, had enabled him to identify a ridge upon the cranial aspect of the frontal bone as the metopic crest, and thus to determine

beyond all question the true median plane. It is 21 mm. from the point of the large fragment (in the frontal region). Mr. F. O. Barlow called his attention to the fact that the contour of the frontal bone when viewed in norma facialis confirms this identification of the median plane, because the summit of the curve is directly above the endocranial metopic crest. Professor J. T. Wilson pointed out to him that the direction of the orbital plate of the frontal bone is such, that it assumes its proper position only when the fragment is so placed that the above-mentioned crest is in the median plane. The backward prolongation of the frontal median crest cuts the parietal fragment precisely along the line determined by Dr. Smith Woodward on other grounds. It indicates that the posterior part of the sagittal suture is obliterated—a view that is confirmed by the presence of an irregular wavy furrow upon the bone, precisely similar to that found in other skulls where this suture had recently closed. This may occur in modern man at any time between about 30 and 40 years of age. The evidence afforded by the parasagittal ridge on the left parietal; by the meningeal grooves; and by the positions occupied by the fragments of the lambdoid suture upon the occipital and parietal fragments, corroborates the correctness of this identification of the median plane.

PROF. A. KEITH.

Professor A. Keith congratulated the authors on the progress made during the last twelve months. He was glad to note that the particular stratum in which the remains of *Eoanthropus* had been found was being distinguished from the more superficial stratum in which flints of the Chellean type had been found. He ventured to say that, if no human remains had been found in the deeper or Eoanthropic stratum, no one would have hesitated in regarding it as of Pliocene age. He was glad to note that the hinder end of the skull of *Eoanthropus* had been opened out to a considerable degree, but in his opinion the occipital and temporal bones were still placed wrongly. When these defects were removed, and the two sides of the skull made approximately symmetrical, it would be found that the brain-capacity was about 1500 c.c. The brain-cast of the skull, as originally reconstructed, was just under 1200 c.c.; it was difficult to see how widening out of the skull would reduce the capacity to 1100 c.c. Two other difficulties he had encountered were (1) the presence of a pointed projecting canine in the jaw and an articular eminence at the glenoid fossa of the skull; and (2) a much-worn canine tooth in a jaw in which the third molar tooth—according to the published X-ray photograph of the Piltdown mandible—was not completely erupted. He agreed that all three parts—skull,

Male Common Tern feeding young.

jaw, and canine tooth—must be assigned to *Eoanthropus*, but he was not convinced that they could all belong to the same individual.

PROF. A. S. UNDERWOOD.

Professor A. S. Underwood said that he would confine his remarks to the two molars and the sockets of the third molar in the Piltdown mandible. He had been prepared to show the radiograph at the Royal College of Surgeons in the summer, but Professor Keith had been unable to place a lantern at his disposal. The two molars were worn down by use to such an extent that it was impossible that the individual could have been less than 30 years of age, probably a good deal more. The sockets of the third molar were not those of an erupting tooth, the roots had been quite completed, and the tooth was in its final position at death. This was very plainly shown in the radiogram. Had the third molar been erupting or about to erupt, the roots could not have been on a plane with those of the other molars.

OUR COMMON SEA-BIRDS.*

With the above title, Dr. P. R. Lowe has published a veritable picture gallery of various aspects of the life of our sea-birds, and the Proprietors of *Country Life* have produced the photographs in the excellent way for which they have so long had a reputation. Dr. Lowe, whose excellent work, 'A Naturalist on Desert Islands,' is already familiar to our readers, now deals exhaustively with the cormorants, terns, gulls, skuas, petrels, and auks. The title of the first chapter alone shows that the letter-press is not mere padding for the photographs:—'Gulls and other Sea-birds in relation to their restriction to the Great Land-masses of the Globe.' The author has also secured the services of Messrs. Pycraft, Ogilvie-Grant, Beetham, Heatherley, King, Pike, and Roberts. While it is perhaps invidious to particularize, we think the descriptions of the terns are exceptionally good. For a specimen illustration see plate III.

NORTHUMBERLAND.†

With its glorious coastline and adjoining islands, its variety of geological structure and its wealth of abbeys, monasteries and quaint churches, an account of the geography of Northumberland makes as pleasing a volume as any in the remarkable series of County Geographies issued by the Cambridge University Press, under the editorship of Dr. Guillemard. 'Northumberland' is by Mr. S. Rennie Haselhurst,

* 20 Tavistock Square, Covent Garden, W.C. 310 pp., 4to, 15s. net.

† Northumberland, by S. Rennie Hazelhurst. Cambridge: 1913, pp. 179, price .

who has been particularly happy in his descriptions of the natural features and archæological treasures of the county, as in the selection of illustrations, which are exceptionally good. We are kindly permitted to reproduce a specimen (plate IV.). These volumes must revolutionize the teaching of geography in our schools.

LIVERPOOL BIOLOGISTS.

The twenty-seventh volume of the Proceedings of the Liverpool Biological Society is even more substantial and valuable than usual, the report of the Investigations at the Lancashire Sea Fisheries Laboratory and the Fish Hatchery at Piel, by Professor Herdman and his assistant, alone occupying over 250 pages, with charts and figures. There is also Mr. J. Johnson's Presidential address on 'Bergson's Philosophy

Photo by] [*A. Scott.*

Ctenophore caught swallowing a Mysid.

of the Organism'; the 26th Report of the Liverpool Marine Biological Committee, by Professor Herdman; Observations of the Marine Algæ of the Isle of Man Area, by Professor Harvey-Gibson and the Misses Knight and Coburn; an interesting paper on 'The Early Days of Comparative Anatomy,' by Professor F. J. Cole, and a well illustrated Memoir on 'Eupagurus' (the Hermit Crab). There are numerous charts and illustrations, one of which we are kindly permitted to reproduce.

—:o:—

The Home Secretary has appointed Mr. William Eagle Clarke, Edinburgh, to be a member of the Home Department's Committee recently appointed to inquire into the working of the Wild Birds' Protection Acts.

Newcastle in Elizabethan Times.

Newcastle To-day.

THE EVOLUTION OF THE BASIDIOMYCETES.*

G. MASSEE, F.L.S., V.M.H.,
Kew.

THERE are three primary groups of fungi, as recognized from a morphological standpoint. (1) *Phycomycetes*, characterized more especially by the presence of sexual reproductive bodies, and mostly of functional value. The members of this group are mostly aquatic in habitat, and are by many considered as being derived from the algæ, which in many instances they closely resemble, but differ in the absence of chlorophyll, hence they are dependent on organic food material. All the species are minute, and are not so well known to mycologists generally as they should be, considering their abundance in this country. This is perhaps because they are more interesting from a cytological than from a systematic standpoint, and do not loom up conspicuously at a fungus foray. (2) *Ascomycetes*. In this group, as in the following, sexuality has completely disappeared, hence the anxiety respecting possible hybrids, which is ever before the student of the higher plants, is unknown to the mycologist dealing with these groups. However, extreme variability within a given genus, or even a given species, is often present, and is a source of equal uncertainty. The leading character in distinguishing the Ascomycetes is purely morphological, and perhaps arbitrary. It depends on the spores, the equivalents of seeds in the higher plants, being produced *within* special cells. This one structural feature is common to many thousands of species of fungi, of very various shapes and sizes. (3) *Basidiomycetes*, as opposed to the Ascomycetes, are characterized by the spores being borne *outside* special cells, usually at the tip. Here again thousands of species are linked together by this one structural feature, which is possessed by the larger, and generally best known, as the toadstools, mushrooms, puffballs, etc. As previously stated, the primitive fungi included in the Phycomycetes were either decidedly aquatic, or inhabitants of damp localities, and the spores of all such possessed the power of spontaneous movement in water, due to the presence of slender cilia, and are known as zoospores. By means of the motile power possessed by the zoospores, the distribution of the fungus was effected. However, by such means the Phycomycetes were restricted to an aquatic habitat, or to those places where a film of water was present, in which the zoospores could travel. In the Phycomycetes we perhaps see the starting-point in the evolution of a group of organisms,

* Given at the meeting of the Yorkshire Mycological Committee at Sandsend.

1914 Feb. 1.

destined to possess their own morphological and physiological features, which eventually became fully evolved in the plants we now know as fungi, as opposed to the characteristics possessed by the algæ, from which they originated. In fact, so highly differentiated and diverse in structure and physiological functions are the most modern group of fungi, the Basidiomycetes, including the gill-bearing species, or toadstools, that if those alone had survived it would have been impossible to have traced any line of descent from the algæ.

The evolutionary power, whatever that may be, was manifest in the pioneers of the fungal world. To cope with the difficulty of being confined to an aquatic habitat, many of the Phycomycetes produced a second mode of spore production, and in this case the spores were purely asexual in origin, and were so constructed that they could be dispersed far and wide by aerial agents—wind, animals, insects, etc. This step enabled fungi, once for all, to take possession of dry land, and from that moment gradual evolution and differentiation has progressed by leaps and bounds. The second kind of spore production alluded to must be looked upon as something new and supplementary to the original sexual mode of spore formation previously possessed by the fungus, and was the starting-point of a sharply-defined division of labour not met with elsewhere so sharply marked in the vegetable kingdom. The later asexual spore formation is spoken of technically as the conidial stage. This is represented by the well-known mildew of the rose. The white powder is a mass of asexually-produced spores, which are produced in immense numbers, and in rapid succession, so long as the plant on which the fungus is parasitic continues active growth for the season. These spores are dispersed by wind, etc., and those that happen to alight on another rose-leaf or young shoot set up a new centre of disease from which spores are liberated in turn, and thus the fungus extends its area of distribution. That is the function of the conidial form of fruit of every fungus, extending its geographical area. But there is a period of the year throughout the world, for climatic reasons, unfavourable to the growth of fungi. As the spores of the conidial condition retain their vitality for only a limited period—often for only a few days, they could not tide the fungus over that period when it could not continue its active growth. The spores produced by the older sexual form are not capable of germinating at once, but only after a period of rest, consequently they remain in a passive or resting condition during that period of the year when the fungus could not continue its growth, but when favourable conditions return these spores germinate and infect the plant, etc., on which the fungus grows, when the conidial condition

is again continued throughout the growing season. Thus the original or first form of spore produced by the fungus at present serves solely for the continuance of the species in time, and has nothing whatever to do with its distribution in space. It will occur to the mind of the botanist that a similar division of labour is presented by ferns and mosses. The prothallus is the sexual stage, where the fertilizing bodies are motile antherozoids, whereas the fern-plant and the moss, as popularly understood, produce asexual spores and serve for the dissemination of the plants in space, and correspond exactly with the conidial stage of the fungi. Leaving the Phycomycetes, the sexual organs in fungi have for the most part disappeared, or may remain as vestiges of no functional value, and in the sense of the primitive method of reproduction, has completely disappeared from the largest and most modern group, the Basidiomycetes. This fact appears to indicate that a sexual mode of reproduction is not one of the indispensable factors that it has been considered to be. Neither is this feature confined to the fungi, as it is well known that in various families of Phanerogams—more especially in the most modern orders, as Compositæ, etc.—sexuality is being abandoned to a large extent, without any apparent inconvenience.

Any attempt to explain the gradual evolution of the Basidiomycetes, culminating with the gill-bearing fungi, from the primitive Phycomycetes, without the aid of numerous figures, is, I think, an impossibility.

Briefly, when the Phycomycetes first commenced to produce the second, or conidial, spore formation, these spores in some species, were produced inside a large cell, as species of *Mucor*. This type of conidial reproduction by numerous grades of evolution, has resulted in the Ascomycetes. On the other hand, the conidial condition of some of the Phycomycetes have the spores borne at the tips of branches, and not enclosed in a cell, or covering. This type in course of time settled down to one uniform specialized form of cell bearing spores at its tip, and technically called a basidium, characteristic of the large section of fungi called Basidiomycetes.

The above ideas respecting the evolution of the fungi is almost entirely based on morphological or structural characters and in some instances it may be that analogy does duty for homology. Furthermore, cytology does not in all instances support current ideas as to affinities. Much more work must be done before a true account can be given of the fungi as a whole, and the work must bear on every aspect of the life-history. I sometimes regret the waste of energy in connection with fungus forays. The time spent in endeavouring, with

varying success, to fit to a fungus a name supposed to have been conferred by someone else, is not very illuminating. It is not even a fair sample of mental gymnastics, and the compilation of lists, often of doubtful value, has had its day, and should give place to something higher than being self-satisfied at having, possibly, given the correct name to a fungus. Perhaps this also applies to other than fungus forays. A correct determination of species is of primary importance, otherwise it would be impossible to convey to other people the organism you are talking about, but there should be a limit to the time spent in naming species, as absolutely nothing is learned about a species by merely finding out, even if correctly, what it is called. Naming species is not science in any sense—it is even far away from the fringe of science—and considering the amount of true scientific work to be done, work which from some aspect or other is within the grasp of everyone interested in the subject, it should prove a welcome change from the time-honoured system of naming the same things year by year—usually with minor variations. I have attended forays for the past forty years, and have thoroughly enjoyed each one, and made many and good friends by so doing, but I have never benefited beyond learning to recognize a few additional species each year.

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The Living Plant. By **William F. Ganong, Ph.D.** London: Constable & Co., pp. xii. and 478. 15s. net. This work is another example of the modern trend in botanical teaching and has for its object the description and interpretation of the functions and structure of the plant as a living organism, and the interesting adaptations it presents to the conditions of the environment. This outlook is in refreshing contrast to the older view which regraded plants as morphological puzzles, or for mere exercises in technical description. A few chapter headings will give some idea of the method of treatment; 'The various ways in which plants appeal to the interests and mind of man.' 'The prevalence of green color in plants, and the reason why it exists.' 'The profound effect on the structure of plants produced by the need for exposure to light.' 'The substance which is alive in plants, and its many remarkable qualities.' 'The peculiar power possessed by plants to adjust their individual parts to their surroundings.' Other chapters deal with growth, protection, reproduction, pollination, dispersal, evolution, adaptation and plant-breeding. The author tells us the book is not intended for botanists and experts, but just such a book that he as a learner would have delighted to read. In this respect he is not alone, the average student will welcome such a book and botanists and experts will find in its pages much helpful material. In the main it is written in clear non-technical language, fruitful ideas and important principles are discussed rather than terms, which are always subordinate. The outlook is physiological rather than morphological, the forms are correlated with the needs of the plant. The work gives an excellent and readable summary of the newer aspects of the subjects dealt with. The illustrations are on the whole good and clear, and if the work could be produced on a cheaper scale and on lighter paper, we feel sure it would be found useful to a still wider circle of readers.

COLEOPTERA IN YORKSHIRE IN 1913.

E. G. BAYFORD, F.E.S.,

NOTWITHSTANDING the general scarcity of beetles throughout the year, the results as set out in the following list are by no means discouraging. As in previous years, the initials H. H. C., E. C. H., W. J. F., W. E. S., E. W. M., M. L. T., G. B. W. and E. G. B., indicate Dr. Corbett, E. C. Horrell, Dr. Fordham, W. E. Sharp, E. W. Morse, M. L. Thompson, G. B. Walsh, and the writer respectively. In addition, we have to welcome a new worker, Mr. C. T. Cribb, of Shipley, whose researches among the Hydradephaga have renewed an old record of 80 years ago, and added another species to the County list. Several melanic forms from the Scarborough district have been taken by Messrs. Horrell and Pearson, and were exhibited at the recent annual meeting of the Entomological Section. These included an almost black form of *Nebria livida* which contrasted in a striking manner with the type, *Harpalus aeneus*, *Amara acuminata*, *Ocypus brunnipes*, *Oxytelus sculptus*, and *O. nitidulus*. From the same district came a specimen of *Otiorrhynchus picipes* in which the normally deciduous mandibles had persisted, and curiously asymmetric forms of *Notiophilus biguttatus* and *Apion violaceum*. A longicorn was handed to me at the meeting which seemed to be *Clytus arietis* L., but turned out to be *Neoclytus acuminata* F. (= *Clytus erythrocephalus* F.) a North American species which has previously been recorded from England. This latest instance occurred at Huddersfield, and illustrates the help which students of other orders are able to give coleopterists without in any way interfering with their own particular study; while carrying it on, in fact. The following list contains the most important species met with during the year. Those which are first records from the county division from which they are recorded are indicated by an asterisk (*) those new to the county by a dagger (†).

The changes of nomenclature which have been found necessary since the latest list was published, in 1904, are included, the old names being added in brackets.

†*Notiophilus hypocrita* Spaeth. Yedmandale, near Scarborough (E. C. H.)
**Dyschirius aeneus* Dej. Thorne Moor (E. G. B.).
globosus Herbt. Upper Swaledale (M. L. T.).
**Bradycellus harpalinus* Dej. Cloughton (E. C. H.).
†*Ophonus brevicollis* Dej. Buttercrambe Woods (W. J. F.).
* *rufibarbis* F. Bempton, Forge Valley (E. C. H.).
**Pterostichus oblongo-punctatus* F. Raincliff Wood (E. C. H.).
Amara curta Dej. Grangetown (G. B. W.).

**Bembidium saxatile* Gyll. Thorne Moor (E. G. B.)
* *atrocaeruleum* Steph. Langdale End, near Scarborough (E. C. H.); Upper Swaledale (M. L. T.).
**Bembidium testaceum* Duft. Forge Valley (E. C. H.)
**Dromius meridionalis* Dej. Raincliff Wood (E. C. H.).
†*Haliplus striatus* Sharp. Tees Mouth (G. B. W.).
Bidessus geminus F. Airedale (C. T. Cribb.).
Coelambus impresso-punctatus Schall. Hackness (E. C. H.).
**Hydroporus nigrita* F. Scarborough (E. C. H.); Skipwith (G. B. W.).
ferrugineus Steph. Mickle Fell (G. B. W.).
**Copelatus agilis* F. Skipwith Common (W. J. F.).
Dytiscus circumcinctus Ahr. and var. ♀ *dubius*. Bubwith and Skipwith. (G. B. W.).
* *Philhydrus testaceus* F. Cayton Bay (E. C. H.).
**Helochares punctatus* Sharp. Gormire Lake (M. L. T.).
Helophorus viridicollis Steph. (=*aeneipennis* Thoms). Bishopdale (W. E. S.)
† *brevicollis* Thoms. Airedale (C. T. Cribb).
†*Hydraena longior* Rey. Langdale End (E. C. H.).
Atemeles emarginatus Payk. Doncaster (H. H. C.).
†*Homalota tibialis* Heer. Birkdale Tarn (M. L. T.).
† *eremita* Rye. Birkdale Tarn (M. L. T.); Bishopdale (W. E. S.).
hepatica Er. Wheatley Wood (H. H. C.).
**Gnypeta ripicola* Kies (=*Ischnopoda caerulea* B. C.). Bishopdale (W. E. S.); Ingleton (E. W. M.).
**Tachyusa atra* Grav. Bubwith (W. J. F.).
**Bolitochara obliqua* Er. Skipwith (W. J. F.).
†*Conosoma pedicularium* Grav. Askham Bog, Skipwith Common (W. J. F.).
**Tachyporus humerosus* Er. Skipwith Common (W. J. F.).
* *transversalis* Grav. Skipwith Common (W. J. F.).
†*Quedius talparum* Dev. Bubwith (W. J. F.).
Lathrobium punctatum Zett. Bishopdale (W. E. S.).
**Stenus fulvicornis* Steph. (=*paganus* Er.). Skipwith Common (W. J. F.).
pallitarsis Steph. Stamford Bridge (W. J. F.).
biguttatus L. Thorne Moor (E. G. B.).
**Bledius fracticornis* Payk. Bubwith (W. J. F.).
gulielmi Sharp (? *defensus* Fauv.). Bishopdale (W. E. S.); Middlesbrough (G. B. W.).
pallipes Grav. (= *terebrans* Schiodte). Whisper dale (E. C. H.)
**Platystethus cornutus* Grav. Bubwith (W. J. F.).
†*Trogophloeus rivularis* Motsch. Bubwith (W. J. F.).
†? *fuliginosus* Grav. Skipwith Common (W. J. F.).
**Syntomium aeneum* Müll. Fewston (E. W. M.).

Lesteva heeri Fauv.(=*sicula* B.C. *nec* Er.). Bishopdale (W.E.S.).
monticola Kies. (=*Sharpi* Rye). Ingleton (E. W. M. Bishopdale (W. E. S.).
pubescens Mann. Bishopdale (W. E. S.). Whisperdale (E. C. H.).
† *punctata* Er. Bishopdale (W. E. S.).;
†*Arpedium brachypterum* Grav. (=*marinum* Stroem). Bishopdale (W. E. S.); Ingleton (E. W. M.).
†*Micralymma brevipenne* Gyll. Scarborough (E. C. H.).
†*Eudectus giraudi* Redt. *v. whitei* Sharp. Ingleton (E. W. M.).
**Phlœobium clypeatum* Müll. Askham Bog (W. J. F.).
Pseudopsis sulcata Newm. Ingleton (E. W. M.).
Anisotoma ovalis Schaum. Eston-in-Cleveland (M. L. T.).
Silpha atrata L. var. *brunnea* Herbst. Saltburn (G. B. W.).
Trichopteryx atomaria DeG. Upper Swaledale (M. L. T.).
**Olibrus aeneus* F. Bubwith (W. J. F.).
Coccinella hieroglyphica L. var. ? *areolata*. Skipwith (G.B.W.).
Triplax aenea Schall. Lartington (G. B. W.).
Cerylon histeroides F. Forge Valley (E. C. H.).
**Hister unicolor* L. Raincliff Wood (E. C. H.).
striola Sahlb. (=*succicola* Thoms). Raincliff Wood (E. C. H.).
† *marginatus* Er. Bubwith (W. J. F.).
Saprinus aeneus F. Hackness (E. C. H.).
Micrurula melanocephala Marsh. Marske (G. B. W.).
**Meligethes fulvipes* Bris. Bubwith (W. J. F.).
**Thymalus limbatus* F. Raincliff Wood (E. C. H.).
**Lathridius bergrothi* Reitt. Scarborough (E. C. H.).
**Cryptophagus setulosus* Sturm. Scarborough (E. C. H.).
affinis Sturm. Bishopdale (W. E. S.).
Atomaria ruficornis Marsh. Bishopdale (W. E. S.).
**Scaphidium quadrimaculatum* Ol. Forge Valley (E. C. H.).
**Scaphisoma boleti* Panz. Cayton Bay (E. C. H.).
**Helocerus fuscus* Ol. (=*claviger* Er.). Bubwith (W. J. F.).
Lathelmis volkmari Panz. Upper Swaledale (M. L. T.).
Esolus parallelepipedus Ph. Müll. Upper Swaledale (M. L. T.)
Dryops ernesti Des Gozis (=*auriculatus* Panz. et Brit. Coll. *nec* Geoff.). Bishopdale (W. E. S.).
†*Litorimus sericans* Kies (=*Hetcrocerus britannicus* Kuw.). Thorne Moor (E. G. B.).
Aphodius nitidulus F. Spurn (G. B. W.).
†*Throscus obtusus* Curt. Bishopdale (W. E. S.).
Lacon murinus L. Forge Valley (E. C. H.).
Limonius minutus L. Yedmandale (E. C. H.).
Agriotes sputator L. Seamer Moor (E. C. H.).
Ludius cupreus F. var. *aeruginosus* F. Yedmandale (E. C. H.)
* *quercus* Ol. var. *ochropterus* Steph. Langdale End (E. C. H.).

**Cyphon padi* L. Bishopdale (W. E. S.).
Podabrus alpinus Payk. var. *rubens*. Yedmandale (E. C. H.).
var. *lateralis*. Raincliff Wood (E. C. H.).
**Cantharis rufa* ab. *lituratus* Fall. Yedmandale (E. C. H.).
Rhagonycha unicolor Curt. Yedmandale (E. C. H.).
Malthodes mysticus Kies. Bishopdale (W. E. S.); Great Ayton (M. L. T.).
dispar Germ. Stamford Bridge (W. J. F.).
**Necrobia violacea* L. Bubwith (W. J. F.).
* *rufipes* De. G. Bubwith (W. J. F.).
**Ptinus tectus* Boield. Scarborough (E. C. H.).
**Sitodrepa panicea* L. Scarborough (E. C. H.).
Aromia moschata L. Langdale End (E. C. H.).
**Rhagium mordax* De Geer. (=*inquisitor* Stroem.). Raincliff Wood (E. C. H.).
Donacia semicuprea Panz. Bubwith (W. J. F.).
**Plateumaris sericea* L. Bubwith (W. J. F.).
Phyllobrotica quadrimaculata L. Buttercrambe Woods (W. J. F.).
**Galerucella sagittariæ* Gyll. Buttercrambe Woods (W. J. F.).
**Longitarsus membranaceus* Fondr. Gormire (M. L. T.).
ochroleucus Marsh. Eston-in-Cleveland (M. L. T.)
anchusae Payk. Langdale End (E. C. H.).
† *senecionis* Bris. Langdale End (E. C. H.).
†*Phyllotreta atra* Payk. Raincliff Wood (E. C. H.).
Scaphidema metallica F. Hackness (E. C. H.).
**Rhinomacer attelaboides* F. Raincliff Wood (E. C. H.).
**Apion cruentatum* Walt. Langdale End (E. C. H.).
* *rubens* Steph. Skipwith (W. J. F.).
marchicum Herbst. Wheatley Wood (H. H. C.).
Polydrusus micans F. Helmsley (G. B. W.).
v. *chlorophanus*. Forge Valley (E. C. H.).
Phyllobius urticae De G., Ab. *pyri*. Whisperdale (E. C. H.).
oblongus L. v. *floricola*. Yedmandale (E. C. H.).
Barynotus elevatus Marsh. Bishopdale (W. E. S.).
schonherri Zett. Bishopdale (W. E. S.).
**Hypera pollux* F. Bubwith (W. J. F.).
* *suspiciosa* Herbst. Richmond (G. B. W.).
**Acalles roboris* Curt. Roundhay Park, Leeds (E. W. M.).
**Balaninus villosus* F. Laytham, near Bubwith (W. J. F.).
**Hylastes ater* Payk. Thorne Moor (E. G. B.).
Myelophilus piniperda L. Raincliff Wood (E. C. H.).
**Ips laricis* F. Forge Valley (E. C. H.).

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The Journal of the Board of Agriculture for January contains a paper on "A Peculiar Soil Disease," by W. E. Collinge, M.Sc. As a Supplement is an excellent "Report on the Possibility of Reviving the Flax Industry in Great Britain" (Sixpence).

LASEOLA ERYTHROPUS SIM., WITH A KEY TO THE BRITISH LASEOLAE.

WM. FALCONER,
Slaithwaite, Huddersfield.

(PLATE V.).

AMONG a number of spiders collected in the neighbourhood of the Lizard Pen., Cornwall, in July, 1913, by the Rev. R. A. Taylor, of Scarborough, and sent to me, were several males and three females of *Laseola erythropus* Sim., examples of which were submitted to the Rev. O. Pickard Cambridge. Previously the species had only been known from solitary males from three widely separated localities, the South of France,* Tonbridge,† and Guernsey. The females mentioned above are therefore new to science and of this sex I append drawings and description.

Laseola erythropus Sim. (Pl. V. Figs. 6-10).

In loco cit. descriptions of the male are given, but M. Simon does not figure it at all and Mr. Cambridge has drawings only of the cephalothorax and eyes, with corresponding drawings of *L. prona* Hahn. for comparison. In neither place are the palpal organs figured or fully described.

MALE, length 2.4 mm.

PALPAL ORGANS of very moderate size and consisting of a number of lobes of varying sizes and shapes, compactly arranged and without projecting processes or spines (figs. 6 and 8). The main lobe, extending from the middle of the outer margin of the tarse to a little below its extremity, contracts gradually above into a blunt rounded apex (figs. 6*a* and 8*a*), on the outer margin of which are two or three minute black blunt denticulae, difficult to see, and less evident in some examples than in others. On each side of its attenuated part is a much smaller lobe of somewhat irregular shape (figs. 6*b* and 8*c*). Above the inner one and not far from the end of the tarse is a small, usually darker-edged crescent-shaped mark, visible from the inner side (fig. 6*d*).

In the other species with a similar type of coloration, the palpal organs are not only quite different (vide plate V.), but with the tarse also form a much larger mass.

* The type specimen—'Les Arachnides de France.' 1881, Vol. V., pt. 1, p. 141.

†Described *sub-proxima* Camb.—'Proceedings Dorset Field Club, 1895, Vol. XVI., p. 102.

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Female, length 2.4 mm. Figs. 9 and 10.

Cephalothorax longer than wide, rising gradually from the posterior margin ; the caput elevated, convex and evenly curved, with black bristly curved hairs on the fore part directed forward, some of them forming a central longitudinal line which anteriorly passes between the posterior central eyes. *Colour*, yellow brown, suffused with black, especially towards the front, where there is a number of roundish yellow brown spots.

Clypeus, high, deeply impressed below the eyes, and then inclined gradually forward to the lower margin ; with upturned hairs and spots similar to those on the cephalothorax.

Ocular Area, blackish, prominent.

Eyes, eight, in two rows, all pearly white except the anterior centrals which are dark, moderate in size.

Posterior Row, viewed from above, curved forward, eyes sub-equal, the centrals distinctly nearer to each other than to the adjacent laterals, the former being fully one diameter apart and close on one and a half diameters from the latter.

Anterior Row, viewed from the front, strongly curved backwards ; the centrals somewhat the larger, widely separated from each other on a rounded prominence, but rather close to the laterals. The central eye space is thus much wider in front than behind.

Palpi and Legs, light yellow-brown (see p. 57) ; the latter, order of length, 1, 4, 2, 3, being long, fairly strong and provided with hairs only, and without darker markings.

Maxillae, Falces and Labium, dull yellow-brown, suffused with black, provided with strong black pubescence and showing numerous yellow-brown spots.

Maxillae, wide below, acuminate towards the apex, and converging round the labium.

Falces short, weak, acuminate ; fang groove without teeth, but with a marginal line of stiff black hairs externally.

Labium, short, semi-circular, much wider than long, flat, free.

Sternum, dark brown, smooth, shining, convex, much longer than wide, its surface set with numerous yellow-brown spots and black, upturned hairs.

Abdomen, black, short, oval, very convex, both surfaces closely covered with minute punctures, and short equal hairs ; the sides and under surface with small, roundish, yellow-brown spots.

Epigastric region and spiracular opercula, dusky yellow-brown.

Epigynal Area, fig. 10, convex with a narrow, red-rimmed, somewhat angular, transverse orifice, more than twice as wide as long, constricted in the middle and situated some distance above the epigastric fold.

Spinners, six, the lowest pair much stronger and larger than the others. In front of them is a conspicuous, curved, transverse vent, the external opening of a breathing apparatus.

In general characteristics and coloration, the females resemble the males, but there are one or two secondary sexual differences. The ocular prominence is less strong, being longer in proportion to its width (fig. 9). The posterior lateral eyes are not quite so distant from the centrals, while the eyes of the anterior row are not so greatly disproportionate in size. The legs are not so deeply nor so brightly coloured as those of the male, but it is possible that the females had not yet reached their full development in this respect. The epigyne is, however, most characteristic and cannot possibly be mistaken for that of any other spider.

The Laseolae are included in the extensive family of the Theridiidae, which in common with numerous spiders belonging to several other families, are characterised by having eight eyes in two rows forming a group much wider than long, three claws to each foot, and short spinners arranged in a compact group. From all these, however, the Theridiids may readily be recognised by their legs, spineless except for a double row of short curved spines on the tarsi of the fourth pair of legs, their strongly inclined maxillae passing almost completely round the free labium, and their falces almost transversely truncate at the extremity, with the fang groove usually without teeth.

In his *Histoire Naturelle des Araignées*, M. Simon merges the genus *Laseola*, which he himself created, in that of *Dipoena* Thor., but as *D. melanogaster* is practically non-existent in Britain, only two examples having been so far met with (a female, Lyndhurst, New Forest, 1858, and a male, Bloxworth Heath, Dorset, 1881), and intermediate forms also being absent, the Laseolae in this country constitute a well marked group, the members of which may be known by their small size (between 2 and 4 mm.), the formation of the prominent ocular area, the arrangement of the eyes, and the very high usually sloping clypeus, and more particularly distinguished from their nearest allies by the upper claws of their feet being provided with numerous teeth reaching almost to their extremity, and by the absence of a stridulating apparatus on the fore part of the abdomen.

There are at present six British species of Laseola; three

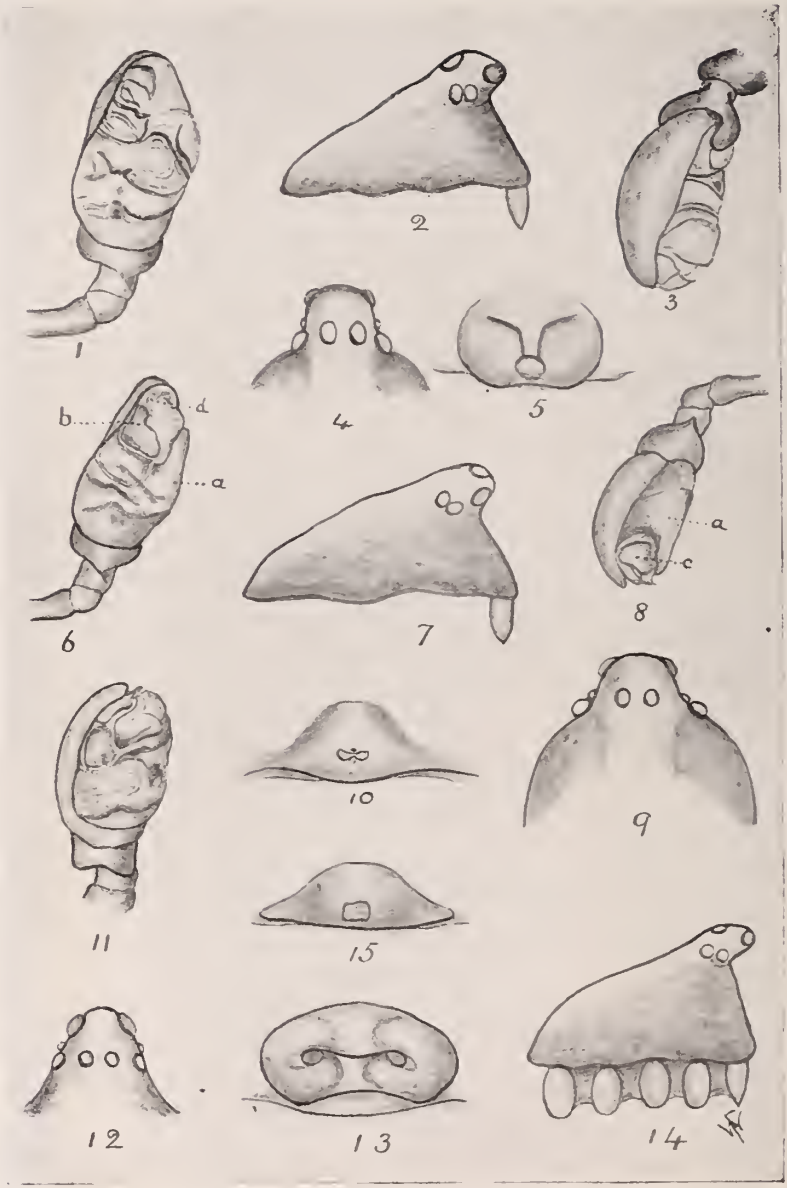
others which have been described under the names of *jucunda*, Camb., *proxima* Camb., and *dissimilis* Camb., (♀ non ♂) being referable respectively to *prona* Menge, *erythropus* Sim , and *inornata* Cambr. This confusion of synonomy and identity has been no doubt, caused by their general great rarity, for only one species seems to be at all frequent, viz., *L. inornata* Camb., which has been found in a few localities in the south, Dorset, Newhaven, Eastbourne, and Essex ; I have taken it in the Isle of Man, and there is an old unlocalised record for Ireland. The distribution of *erythropus* Sim., has already been given. *L. prona* Menge and *dissimilis* Camb (one male only, the type) have occurred in Dorset ; *L. tristis* Hahn, in Wales, and at Bloxworth Heath and Killarney ; *L. coracina* C. L. Koch, Bloxworth and Suffolk. (one ♂).

Taking their general coloration as a basis, the Laseolae may, for the purposes of identification, be divided into two groups, the darker forms *L. tristis* Hahn and *coracina* C. L. Koch in one, and the lighter forms, the remainder, in the second. Attention should then be given to the size and relative position of the eyes and the curve or otherwise of the posterior row, but the surest means of discriminating the various species is afforded by the shape of the ocular prominence and the genitalia characteristic of each of them, and reference to the figures of these parts in the plate will render it easy to determine the identity of any species under examination. Some of the Laseolae are found on bushes or the lower branches of trees, and others beneath stones and pieces of rock.

KEY TO THE BRITISH LASEOLÆ.

I. Posterior central eyes distinctly nearer to each other than to the adjacent lateral.
  1. Cephalothorax black or blackish brown. Legs in part black or very deep brown.
    i. Posterior eyes equal. ♂ small, ♀ fairly large ; centrals nearly 1 diameter apart. Tarsi of legs black. Epigyne, Fig. 15 .. *tristis* Hahn.
    ii. Posterior eyes fairly large. ♂ nearly equal, ♀ centrals visibly larger than laterals ; centrals much more than 1 diameter apart. Tarsi of legs white or yellowish white ..*coracina* C.L.Koch
  2. Cephalothorax yellowish or reddish brown. Legs lighter brown, unicolorous.
    i. Eyes large ; posterior row nearly straight. Legs of moderate length. ♂ palp larger, ♀ unknown .. .. *dissimilis* Camb.
    ii. Eyes moderate ; posterior row distinctly curved forward. Legs long. ♂ palp smaller, Figs. 6 and 8. ♀ epigyne Fig. 10 *erythropus* Sim.

II. Posterior eyes equidistant, or centrals a little more separated. Some of the leg joints normally suffused a darker brown.
  1. Posterior eyes large, the row curved forward ;



Parts of British Spiders:—Laseolæ.

centrals not more than 1 diameter apart. Ocular prominence broader and less pointed. ♂ palp Figs. 1 and 3; ♀ epigyne Fig. 5 .. .. *inornata* Camb.

2. Posterior eyes moderate, the row straight; centrals more than 1 diameter apart. Ocular prominence narrow and more pointed. ♂ palp Fig. 11; ♀ epigyne Fig. 13 .. .. .. *prona* Menge.

REFERENCES TO PLATE V.

Laseola inornata Camb.
- Fig. 1. Male, left palp, from below and a little to the inside.
- Fig. 2. Male, cephalothorax in profile.
- Fig. 3. Male, left palp from the outside.
- Fig. 4. Male, ocular prominence.
- Fig. 5. Female, epigyne.

Laseola erythropus Sim.
- Fig. 6. Male, left palp from below and a little to the inside. (*a*) Main lobe; (*b*) Side lobe; (*d*) Crescent-shaped process.
- Fig. 7. Male, cephalothorax in profile.
- Fig. 8. Male, left palp from outside; (*c*) Side lobe.
- Fig. 9. Female, ocular prominence.
- Fig. 10. Female, epigyne.

Laseola prona Menge.
- Fig. 11. Male, left palp from outside and a little below.
- Fig. 12. Ocular prominence.
- Fig. 13. Female, epigyne.
- Fig. 14. Cephalothorax in profile.

Laseola tristis Hahn.
- Fig. 15. Female, epigyne.

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Underground Waters for Commercial Purposes, by **F. L. Rector.** New York: J. Wiley & Sons; London: Chapman & Hall. 98 pp., 4s. 6d. net. This book is written for readers in America, where in 1911 there were 732 springs, with a combined output of 63,923,119 gallons of mineral waters, and we fear it will not appeal very much to the English public. It deals with springs, wells, properties of water, and its chemical, bacteriological, and microscopical examination. Four and sixpence seems rather a lot for fewer than a hundred small pages, and the copy sent to us is bound upside down.

The Petrology of the Sedimentary Rocks, by **F. H. Hatch** and **R. H. Rastall.** London: G. Allen & Co., pp. xvi.+425, 7s. 6d. net. This is the second volume of the authors' Textbook of Petrology, and deals with Deposition in general, Fragmental, Chemical and Organic Deposits, Metamorphism, Cementation and Metasomatism, and Weathering, and there is a useful appendix on the Systematic Examination of the loose detrital sediments, by T. Crook. Examples in illustration are drawn from various parts of this country and abroad. There are sixty illustrations of rock sections, etc., mostly British.

History of Geography, by **J. Scott Keltie** and **O. J. R. Howarth.** London: Watts & Co., 154 pp., 1s. This remarkably cheap book should enable anyone interested to get a thorough and reliable record of the progress in geographical science. The position of one of the authors, as Secretary of the Royal Geographical Society, is a guarantee of accuracy. The volume deals with Greek and Roman Geography, the Dark Age, Portuguese Expansion, the New World, Polar Exploration, James Cook, African Research, Methods of Mapping, etc. It is a wonderful record of a wonderful science, and should especially appeal to teachers.

THE FUNGUS FLORA OF THE MULGRAVE DISTRICT.

C. CROSSLAND,
Halifax.

THE following is a summary of Mycological work done in the neighbourhood of Lythe, Mulgrave, and Sandsend. 1894, 1900, 1908, 1910, 1911, 1912, and 1913.

As a Mycological Section of the Yorkshire Naturalists' Union, our first acquaintance with Mulgrave Woods was made in 1894—2nd to 4th September—when the Annual Foray was shared between Mulgrave and Arncliffe, with Whitby as centre. In the list of fungi found at both places 102 of the 189 are marked 'M.' The list was not printed, but remained in MS. about eight years, and then utilized in the compilation of the Yorkshire Fungus Flora. The Mulgrave list has one or two interesting features and pleasant reminders. A glance at the few Discomycetes shows four *Helvellas* to have been gathered—*crispa*, *lacunosa*, *infula*, and *elastica*. *Leptoglossum viride*, another of this group, was seen in quantity on a mossy mound under a spreading beech tree. On other mounds were the abundant white gelatinous knobs of *Hygrophorus cossus*, while beneath and beyond the horizontal tree trunk near Sandsend the stream bank was decorated with the prettily-speckled *Tricholoma terreum*. These, and other sights of rarer species, fixed themselves on one's mind, and made Mulgrave memorable. It was on this occasion the interesting *Neotiella nivea* was first found in Britain.

That short visit created in the Committee a longing to see more of these woods, and although we wandered about Yorkshire, visiting Huddersfield and Hebden Bridge in 1895, Selby in 1896 (when the British Mycological Society was founded), Barnsley 1897, East Keswick 1898, and Sutton, near Askern, 1899, we could not get Mulgrave Woods out of our minds. In consequence it was decided at Sutton to recommend Lythe for the year 1900. The Executive made the One hundred and fifty-fifth a joint Meeting—Whitby for the investigation of the Natural History of the Coastline from Sandsend to Kettleness, Saturday, 15th September, to be followed by a Fungus Foray centred at Lythe, 15th to the 22nd. Messrs. W. D. Roebuck and Edwin Hawksworth, in searching Lythe for suitable headquarters for the mycologists, fortunately alighted on Nineteenlands Farmstead, which proved both comfortable and convenient, and near the best part of Mulgrave Woods. No better situation could have been selected as a working centre. It was thought if sufficient material, from a systematic standpoint, could not be met with to keep us employed all

the week, we might fill up the time by going to Arncliffe, but it was soon found there would be no need for this. During the five days 422 species and four varieties were collected and determined. For the Report and List see *The Naturalist*, 1900, pp. 337-346. Two species were new to the European Fungus Flora and two others to the British Flora. Many were additions to Yorkshire. Three hundred and fifty-six were new records for Mulgrave, making 458. A few notable features may be given. There were thirteen species of *Clavaria*, forty-nine *Discomycetes*, thirteen *Hyphomycetes*, and sixteen *Myxomycetes*. There was the rare *Diplocarpa Curreyana*, *Craterellus cornucopioides*—fine specimens and plenty of them—and the peculiar little agaric *Marasmius Hudsoni*, which grows on dead holly-leaves. After all this, and very much more, where is the mycologist who would not want to pay another visit at the first opportunity? It must be admitted the season was an exceptionally good one for fungi—short heavy rains alternating with spells of heat.

The Annual Foray in 1902 was held at Egton Bridge for Arncliffe. Our favourite locality being so near, we could not resist the opportunity of a visit. Quite a number of species was noticed, but only those not previously recorded for Mulgrave Woods were included in the joint list and marked 'M.' The twenty-eight new records included a fifth *Helvella*—*H. ephippium*—and several other uncommon species. (See *The Naturalist*, 1902, pp. 355-6.)

After 1902 five years elapsed before we ventured to again propose Mulgrave. In 1903 we were at Helmsley, 1904 Rokeby, 1905 Maltby, 1906 Farnley Tyas, 1907 Grassington, Bolton Woods, and Buckden. At the last four places we sadly missed our chief, who had not been with us. At the Grassington Foray we decided to hold out a temptation to him for the following season which we thought would be irresistible. The temptation was Mulgrave Woods, with Nineteenlands Farm as headquarters, and it succeeded. The Union obtained Lord Normanby's permission to investigate the woods in September, 1908, but when the time came round it was found the farm had changed its tenant, and the then occupier did not receive visitors. The disappointment was, however, somewhat relieved on finding our former hostess, Mrs. Kidd, of Nineteenlands, kept a boarding-house at Sandsend where we could be accommodated. Certainly we were a little further away from the best ground, but even then no drives were necessary, at each end of the day, to reach it and return. Moreover, there was an advantage at Sandsend in being able to obtain the use of the schoolrooms which have since served us so well as general meeting and workrooms. For the use of these we have often had reason to feel sincerely grateful to the Vicar of Lythe.

The Foray was remarkable from several points of view, (1) the number of species met with, viz., 611 ; (2) the prevalence of certain genera. For instance, *Mycena* was represented by thirty-two species, *Cortinarius* by twenty-nine, *Russula* twenty-eight, *Tricholoma* twenty-four, *Lactarius* twenty, *Hygrophorus* eighteen, *Inocybe* thirteen, and *Pholiota* ten—a most remarkable array for one meeting. Of the 611 and twelve varieties dealt with, 256 were additions to Mulgrave, including three new to Britain and twenty-four others to Yorkshire. (See *The Naturalist*, January 1909, pp. 21-29.)

The Foray was held at Castle Howard in 1909. On discussing the place of meeting for 1910, it was decided that we ought to recommend further investigation in Mulgrave Woods, so as to work them fairly well.

In 1910 permits for Mulgrave Woods and the use of the schoolroom were again kindly granted. One hundred and forty-eight of the 563 noted, along with six varieties, were further additions. A few of these were gathered in spring. (See *The Naturalist*, 1911, pp. 21-28.) It will be noticed that six species were new to Britain, and about twenty-others to Yorkshire. We wondered where we should have to go to discover six agarics not previously recorded for Great Britain, along with several other rarities, in one locality, within a few days. We couldn't tell, and thought the best course to pursue would be to continue our researches in the neighbourhood of Lythe, Mulgrave, and Sandsend a few years longer, and by so doing bring the work more into line with modern ideas of field investigation—that is, work one clearly-defined area well.

It was with this intention that a second informal spring foray was held towards the end of May, 1911. In May we were confined to the days and parts of the woods open to the general public. The results were included in the report of the September meeting (see *The Naturalist*, 1911, pp. 387-393). A reference to this will show that the two meetings yielded 138 further additions to the district. Forty-five of these were new to Yorkshire, among them being three new to Britain and two to science.

At this foray Mr. Massee, by invitation of Lord Normanby, lectured in the Mulgrave Castle schoolroom on 'Diseases of Plants caused by Fungi.' The lecture was advertised in the Whitby papers, being arranged for the special benefit of local farmers, fruit-growers, woodmen, cottage gardeners, etc. It was illustrated by well-prepared slides through a powerful lantern provided by his lordship. The lecture was much appreciated.

In May, 1912, there was a third Spring Meeting. The time was mostly spent in searching for Pyrenomycetes and other minute fungi that occur on fallen branches, twigs, dead

leaves, etc., in the early part of the year. One hundred and seventy-three species were finally determined, about fifty being additions to previous lists.

At the September foray five agarics not previously recorded for the British Isles were found. Three of the five were figured by Miss Massee on Plate I. of *The Naturalist* for January. These was also a beautiful little greenish Mycena—*M. chlorantha*. Of the 392 found, fifty-seven were still further additions to the district, making 107 for the year, thirty-four being new to Yorkshire, ten of which were new to Britain. (See *The Naturalist*, January 1913, pp. 21-28, with Plate.)

In 1913 two meetings were again held. Twenty-seven further species were added to the district records in May, and sixty-one in September. Thirty were new to Yorkshire, two being new to Britain (See *The Naturalist*, Jan., 1914, p. 12).

Prior to the publication of the Yorkshire Fungus Flora in 1905, it was impossible to tell which were new to Yorkshire. The appearance of that work put the county records on a proper basis, and made it an easy matter to keep them periodically posted in *The Naturalist*, where they may be followed.

At and since the foray of 1908 no fewer than 166 Mulgrave finds have proved to be new to Yorkshire, to which may be added one found in 1894 and four in 1900, making 171. Of these thirty-three were new to Britain, two being new to science.

There must be many widely-spread species certain to be there which we have not yet seen, especially micro-species. The grounds at Kew, of about 300 acres only, have yielded over 2,200 species. If it was possible to carefully investigate all suitable spots at various times of the year, the known mycological flora could still be very considerably increased. A glance at the table shows that we are comparatively weak in some branches, especially the Ascomycetes, considering the great number of known British species. Nor are either the Deuteromycetes or the Hyphomycetes at all well represented.

So far as we have found, under thirty are parasitic on the trees; under fifty on herbaceous plants and other fungi; and three or four on insects. The rest live as saprophites on dead and disintegrating vegetable substances, which they help very largely to break down and reduce to humus. These ancient and charming woods, situated near the sea, and intersected by streams, are to some extent independent of weather conditions, so far as moisture is concerned.

These bring the total revised and corrected number registered for the Lythe-Mulgrave-Sandsend district to about 1245. Numerous varieties have been recorded, but none taken into account in these calculations. The records have accumulated as follow :—

Date of foray.	Additions.	Date of foray.	Additions.
1894	102	1910	148
1900	356	1911	138
1902	28	1912	107
1908	256	1913	88

Miscellaneous, 22.

They are tabulated below. Classification and terminology as in the Yorkshire Fungus Flora.

			Gen.	Sp.
Basidiomycetes	Gastromycetes		9	18
	Hymenomycetes	Agaricaceæ	46	563
		Polyporaceæ	8	70
		Hydnaceæ	7	26
		Clavariaceæ	4	35
		Thelephoraceæ	11	59
		Tremellaceæ	9	18
		Exobasidiaceæ	—	—
		Uredinaceæ	19	56
		Ustilaginaceæ	3	4
Ascomycetes	Pyrenomycetes		38	99
		Perisporiaceæ	5	5
		Hysteriaceæ	5	6
	Discomycetes		41	135
		Onygenaceæ	—	—
		Elaphomycetaceæ	—	—
		Cenococcaceæ	—	—
		Tuberaceæ	1	1
		Gymnoascaceæ	—	—
		Exoascaceæ	—	—
Phycomycetes			12	18
	Deuteromycetes		11	18
	Hyphomycetes		36	62
Myxomycetes			22	52
			278	1245

The woods abound in remarkably fine, well-grown timber trees, the chief being oak, with a fair mixture of beech, ash, chestnut, sycamore and wych-elm. There are many magnificent specimens of each of these kinds. The shrubs consist mostly of Rhododendron and Cherry-laurel. Unfortunately, the sycamore leaf-blotch, *Rhytima acerinum*, is rather prevalent. The larches are in a healthy state, and, so far as we have seen, practically free from the larch disease, *Dasyscypha calycina*. There is a good variety of pines. The surface soil is a mixture of disintegrated lias shale and humus. The undergrowth varies in different places. Under the elms it is mostly dog's mercury; under beeches sparingly mossy where not quite buried under decaying leaves. Woodsage is common, especially among the oaks, and bracken in the open. *Felix-mas* is the commonest woodland fern.

The erratic appearance of fungi has always been a puzzle, and, to a large extent, is yet. One of the objects of our frequent visits has been to obtain some insight into their ways and doings. They are 'shifty' creatures, though they cannot walk or fly in the flesh. Their production of spores is vast, and these can be carried on the wings of the wind, and by other agencies, to fresh places, when the pabulum upon which they have been flourishing is exhausted so far as they are concerned. We can only count upon being certain to find the more common species at any given time. On the other hand, fresh faces of some kind keep constantly cropping up.

One of our objects has been to prove the great prevalence of these interesting organisms, which play so important a part in the economy of nature—usually as agents of decompositions. Their presence is not a question of this or that particular place; they occur more or less universally wherever animal or vegetable organisms exist.

The knowledge of our efforts as a section of the Union should stimulate other Societies to work out special areas in a similar manner. The desire to study the subject, both in the field and the laboratory, is spreading, and helpful literature is periodically appearing both on the systematic, economic, and morphological aspects of the subject.

We are hoping for a greater increase of young students equipped by special training and facilities to undertake the study of life-histories and other phases of development. There is almost unlimited scope. Several are already in harness. This is really by far the most useful and interesting side to both those who can do it, and to those who cannot hope to do more than study results of such advanced mycological work.

We owe much to the generosity of Lord Normanby for so often allowing us to look through the woods, and to the Vicar of Lythe for placing the Sandsend schoolroom at our disposal.

One other advantage has been to have our headquarters close at hand. We have never yet been able to obtain anything like the same combination of facilities in any other district.

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The Holiday Nature Book, by **S. N. Sedgwick.** London: C. H. Kelley, 3s. 6d. net. This compilation deals with the various and numerous aspects of natural history, principally relating to the sea shore, and has evidently been prepared to attract the eye of the 'young naturalist,' or his parents. There is a monthly nature calendar, with spaces to be filled in by the reader. The author has attempted too much and hardly comes down to the level of his readers. For instance, 'among the beetles,' we find that *Hydrobius fuscipes* is black, common in stagnant water at roots of plants. *Berosus affinis,* dark brown, common in water.' There is a chapter on 'Nature Photography' illustrated by poor photographs. There are many useful illustrations, but they frequently lack definition.

The Earth: Its Genesis and Evolution, considered in the light of the most recent scientific research. By **A. T. Swaine.** London: Charles Griffin & Co., pp., 277, price 7s. 6d. net. We cannot find that this book contains anything new, nor does the author claim that it does; he merely professes to give an account of the geological history of our planet in non-technical language. He is 'strong' on 'cycles'—sedmentary cycles, organic cycles, the Siluro-Devonian cycle, and so on, though in some cases the use of the word is not quite apparent. The first chapter deals with the earth's beginning, 'stellar cycles' and the inconsistency of the Nebular Hypothesis; by Chapter IX. we have reached 'The Primary Earth'; The 'Coal Measures' in Chapter XIII.; Chapter XVI. deals with 'Cause of the Glacial Episode'; XVII. with 'The Jurassic Seas'; and so on to Chapter XXVI., 'Transgression: General.' The chapters are split up by series of sub-headings which should enable the reader to obtain the drift of the argument. There are some points of detail with which one must differ, for instance, seeing that the mounds on Flamborough Headland are on the top of the cliffs, over 400 feet above the sea level, they can hardly have been in the shape of a bar 'such as is formed at the mouth of large rivers, where the current meets the tide.'

Prehistoric Times, as Illustrated by Ancient Remains and the Manners and Customs of Modern Savages. By the late **Lord Avebury.** Seventh Edition. London: Williams & Norgate. 623 pp., 10s. 6d. net. The late Lord Avebury, better known under his first name, Lubbock, was in many ways a remarkable man, and was the author of numerous books on a diversity of subjects. His best known work was probably his 'Prehistoric Times,' the first edition of which appeared so long ago as 1865. That was the time when the foundations of prehistoric archæology, as a science, were being laid. He had the fellowship of Evans, Prestwich, Tyndall, Boucher de Perthes, and others. He personally examined critical sections and all the important collections therefrom. His book was based on a series of articles which appeared in *The Natural History Review,* dealing with Danish Shell Mounds, Swiss Lake Dwellings, Drift Implements, Cave-men, and North American Archæology. The progress of science has resulted in many of his conclusions being proved to the hilt; some suggestions have been modified or dropped. And in any case much that appeared in 1865 would be unnecessary to the student to-day. We understand from the publishers' note that only a few months before his death Lord Avebury thoroughly revised his book, omitting much unnecessary material and adding details of recent discoveries, even including references to the Piltdown skull. The book is remarkably well illustrated, has a very good index, and is very cheap.

FIELD NOTES.

BIRDS.

Decrease in Starlings at Harrogate.—This year, for the first time, we have no starlings coming to the food put out for the birds. We have had very few nesting birds about the immediate neighbourhood during the summer, but the decrease is most marked this winter. We have usually had twenty to thirty daily visitors, but five is the most I have seen at one time at the food, and days pass without one being seen. At the time of writing a pair of starlings are feeding a lusty brood at Lund House Green near here. The parents must have been 'hard put' to provide food for them during the recent storm.—R. Fortune, Harrogate.

Waxwings at Whitby.—Since the winter of 1910-11 the Waxwing has not been noticed in the Whitby district until this winter, when it has again made its appearance in considerable numbers. On 6th December six were observed and one shot. Two were captured on 10th December. On the 22nd twenty-one were observed in a sheltered valley about a mile east of Whitby, three of them being captured. A flock of eight was seen on the 28th, and another bird fell a victim to the gun on 3rd January. Those birds which came under examination had from three to six of the red waxlike appendages attached to the ends of the secondaries. None of them had any appendages to the tail feathers.—Thos. Stephenson, Whitby.

Starling Migration.—On the morning of Monday, 30th December last, I was passing along Spa Wood Top, about half a mile from Newsome, near Huddersfield, when, some distance away in the north-east, there was a peculiar dark mass which was rapidly approaching the direction I was taking. When overhead, at no great distance, I saw it was a huge flock of starlings, fully four to five hundred in number, heading strongly almost due south. The sun was shining from a blue sky on a snowy landscape, and the passing of the birds created quite a shadow. Some ten minutes later another flock of starlings, of smaller dimensions, also passed from, and heading to, the same direction as the larger flock, and moreover, the birds comprising this smaller flock were more widely extended. There is no winter roost of starlings within the neighbourhood of Newsome. After the tempestuous weather prevalent during the Christmas holidays, frost set in, and on the evening of the 29th December snow fell to a depth of about three inches, and on the evening of the 30th there was a further heavy snowfall.—W. E. L. Wattam, Newsome.

Nesting of the Waterhen.—On 26th June, 1913, while trout-fishing in Forge Valley, near Scarborough, I noticed a pair of Waterhens which, by their actions, convinced me that they had young ones close at hand. The birds were feeding round a dense bed of Water Crowfoot, which made a smooth green carpet on the surface of the water and covered a considerable area. At 3-30 p.m., when I passed this place, there was then no sign of a nest. Upon returning to the same place about 7 p.m., I was surprised to find the female bird busily engaged in constructing a nest on the centre of the bed of Water Crowfoot. The Waterhens in Forge Valley are used to numbers of people passing along the banks of the river, the valley being a popular pleasure resort, and are consequently fairly tame, and this particular individual showed no concern at my presence as I sat down upon the bank some fifteen yards away. The construction of the nest had apparently only just started, and the bird was busily occupied gathering bunches of the waterweed in her beak and piling it in a heap in the centre of the weed-bed, some six feet from the bank and absolutely without concealment. Having formed a rude heap of material, the architect climbed upon it, and with the aid of beak, breast, wings, and feet, proceeded to form it into a well-shaped nest. This being constructed to her liking, she went to the bank and broke off a number of green growing leaves of the Iris, and with these a neat lining was added. She then climbed into the now finished nest, and uttered a low note several times in succession, which brought out from its concealment under the overhanging boughs of an Alder bush a newly-born young one, which did not appear to be more than twenty-four hours old, if as much. This single young bird, which appeared to be the only one, ran over the surface of the weeds to the nest, but was unable to climb into it. The old bird therefore reached over, and seizing the chick gently in her beak by its neck, assisted it into the nest. Here the mother appeared to feed the young one with food brought up from her crop, but I could not quite satisfy myself that food did actually pass between them, although I think it did. After this the chick settled down beneath its mother's wing, and at about 8-45 p.m. I left the pair apparently settled for the night. The male bird kept some distance away and took no part in the proceedings at any time. I saw the nest on the following afternoon, and evening and on several subsequent occasions, but did not see it again used. W. J. Clarke, Scarborough.

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Bird Notes from Hebden Bridge.—Apropos of the changing distribution of the Long-tailed Titmouse in the West Riding, and of its uncommon occurrence in Upper Airedale and

Upper Wharfedale at any time of the year (see *The Naturalist*, 1909, pp. 55-57), there was a party of these birds in Gibson Wood, near Hebden Bridge, in Upper Calder Valley, on 22nd November. It is from ten to fifteen years since I saw a flock here before. That it formerly bred sparingly in this district is proved by a nest in the Halifax Museum, labelled 'Hebden Valley,' and taken by J. Crossley in 1871. The late John Dewhirst told me that a nest was once found in the adjacent Colden Valley—probably a later record—but I have no personal experience of its breeding here. I saw the birds again on the 29th and 30th November. There were at least a dozen on each occasion. * Unusually large numbers of Blue and Coal Tits have also frequented the same wood during the last few weeks, but immigrant Goldcrests are hardly as abundant as usual. A single Swallow was flying over the Calder, at Hawksclough, on the 29th November. I never heard of one here so late before.—Walter Greaves, Hebden Bridge.

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ENTOMOLOGY

***Colias edusa* in Lincolnshire.**—I had pleasure in observing this insect in comparative abundance in the parish of Goulceby on 8th September, about eight miles from Louth. I also was shown one specimen about the same time, taken near Grimsby.—J. Larder, Louth, December, 1913.

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Among the New Year honours we are glad to see that Sir Archibald Geikie has received the Order of Merit.

A proposition has been made to present a portrait of Sir Archibald Geikie, the retiring president, to the Royal Society.

A specimen of *Catocala fraxini* (The Clifton Nonpareil) was taken at Grange-over-Sands last year. (*The Entomologist*, January, 1914.)

Messrs. Wheldon and Travis record *Lecidea Gagei* A. L. Sm. (*L. Taylori* Mudd) a new Lancashire Lichen, from Colne; in the *Lancashire Naturalist* for December.

Mr. A. W. Summersgill has a paper on 'The Theory of Staining' in *The Micrologist*, volume 2, part 7 of which has recently been published by Messrs. Flatters, Milborne & McKechnie, of Manchester, price 1s. 6d.

The *Proceedings of the Cheltenham Natural Science Society*, Volume 2, Part 2, contains the presidential address of Dr. E. T. Wilson, entitled 'The Flints of the Cotteswolds and their uses.' There are also other notes.

From the Sixth Annual Report of the Court and Governors of the *National Museum of Wales*, it is apparent that the building has reached the ground floor level. The contents of the Municipal Museum at Cardiff have been handed over to the National Trustees, and are now known as the Cardiff collections. The report contains illustrations of a tiger presented by the king, a hand loom, etc.

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* No doubt a family party.—Ed.

REVIEWS AND BOOK NOTICES.

The Courtship of Animals, by **W. P. Pycraft.** London: Hutchinson and Co., xvi. + 318, 6s. net. This work follows closely upon the same author's 'Infancy of Animals,' and deals with a very neglected branch of the study of natural history; so much so indeed that the marvel is Mr. Pycraft has been able to gather together so much information in reference thereto. He begins with The first marriage, Primitive man,

Photo by] [*W. H. St. Quintin.*

The Display of the Great Buzzard.

Polygamy, Standards of Beauty, then to the courtships of man-like apes and musical chimpanzees; the courtship of mammals, land and marine; courtship among birds (a large order); then we get the courtships of the crocodile, lizards and frogs, and even love among the fishes and insects, spiders and crabs. The volume is full of unexpected and surprising pieces of information, but strictly scientific withal, and is of the greatest value to the student of evolution.

Camping in Crete, with notes upon the Animal and Plant Life of the Island, by **A. Trevor-Battye,** with a description of the Caves, etc., by D. M. A. Bate. London: Witherby and Co., pp. xxi.i+308, 10s. 6d. net. Those who are familiar with Mr. Trevor-Battye's work will expect great things from him in his monograph dealing with his recent visit to Cyprus—or Crete as the island is more familiarly known. On account of the inaccessibility of the island, it is sadly neglected by Englishmen, but the author opines that it will someday be 'discovered,' and much more frequently visited, and towards this discovery he has done much in the present work. With a charmingly facile pen, Mr. Trevor-Battye describes the flora, fauna, scenery, people, antiquities, in fact the various and numerous aspects of the island and its inhabitants, all with equal care and interest. Students of geography and antiquities will find equal interest to the naturalist in perusing this work, while its fascinating style will appeal to many who are not specially interested in any particular science. There are several good illustrations.

Butterflies and Moths in Romance and Reality, by **W. F. Kirby.** London: S.P.C.K., pp. 178 and 28 coloured plates. 5s. net. Before the work appeared, W. F. Kirby died, and it was therefore seen through the press by Dr. W. E. Kirby, who has left it, as far as possible, in the form prepared by the author. The book begins with 'What are Butterflies and Moths?' and then deals with their development, numbers, destructiveness, enemies, classification, 'butterflies in poetry', etc. There are several illustrations in the text, but by far the outstanding feature of the volume lies in the 28 coloured plates which portray the insects as near life-like as we remember to have seen them.

The Secrets of Nature Exhumed, by **Lady Blount** ('Zeteo'), Worthing, variously paged, second edition. Lady Blount, whose charming portrait appears on the cover, herein tilts at astronomers and 'globites,' both in prose and verse. On the cover is also a diagram showing the position of an observer on the planet at various itmes of the day, with the description that:—

'At (*a*) man in his tent MUST be,
He through its bounds can't enter,
No matter if on Earth or Sea,
He's in his own eye's centre.
Where e'er he moves his tent moves too,
And then he gets a different view.'

There is a poem on 'The Ancient Apple,' which Lady Blount has also set to music 'with a *striking* refrain,' the first verse of which reads:

'Sir Isaac, called Newton, once dreamt a strange dream
After dinner, so full of good things;
Which sweetly inspired him to write a new theme,
To make his Globe fly without wings.
Under an old apple tree in the shade
He dozed till an apple fell down,
It pounced on his nose, which much redder it made,
Then alighted all squashed on his gown.'

We learn that a 'Cambridge Scholar,' a Dr. ———, M.D., B.A., etc., states that he has learnt more truth relating to astronomy from Lady Blount's writings than from all those Professors at Cambridge from whom he received the gold medal for Astronomy in which he excelled,' and we don't for a moment suppose he was pulling Lady Blount's leg—to use a modern expression. But not being an astronomer ourselves we must leave our readers to peruse the book and form their own conclusions.

The Animal Kingdom Illustrated, by **Prof. Zwanziger,** translated by G. K. GUDE. London: S.P.C.K., 92 f'cap pages and 27 double plates, 8s. 6d. net. The book contains illustrations (coloured) of typical representatives of all the principal families. In the case of those of economic or industrial importance, elaborate and detailed accounts of their habits are given, while those merely of general interest are dealt with in a more concise manner. The salient characters of all the divisions and classes, as well as of most families and genera, into which the Animal Kingdom is divided, form a special feature of this work, which is intended to arouse the interest of young readers in the wonders of the Animal Kingdom. Altogether 231 species are dealt with, each being represented by a coloured figure. These occur on plates measuring 16×13 inches each. The drawings are not too highly coloured, and are generally well done. It will make a welcome gift book for a young naturalist.

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A specimen of the Bohemian Waxwing made its appearance at Hunmanby, near Filey, just before Christmas, and, being a rare bird, it was promptly shot by one William Bolt. Another was shot at Howden on Dec. 20th, and another at North Burton.

CORRESPONDENCE.

The Romans in Yorkshire.

Keighley, *7th January*, 1914.

A sense of humour in a critic often detracts from the value of his criticisms. Though this may be debated, at any rate all will agree that humour leading to inaccurate statements is inadmissible. In *The Naturalist* for January (page 2) some remarks on my paper on the Harden Slag-heaps, etc., find place. (1) The writer says: "We quite agree that the arguments given in their favour are of a rather circular nature." One and one argument alone is of such a nature, and that concerns only one detail of one part of one road. The critic's remark is, therefore, misleading, to put it mildly. (2) Again, he says: "But surely such words as 'possible' and 'probable' would not spoil the value of the papers." He quotes two pieces of my article, and though those two words which alone he apparently approves of are not contained in them, it will be noticed that each is qualified. In fact I challenge him to bring forward a single debatable statement from that paper which is not qualified. His remarks on this head are again, to put it mildly, misleading.—Francis Villy.

The writer of the note referred to by Dr. Villy professes to know something of Roman sites in Yorkshire. He also claims to be able to understand a paper on the subject and to give his views thereon without, 'to put it mildly, misleading.' That Dr. Villy, who is one of the persons whose writing is criticised, may not quite see the 'humour' is not our fault. We agree with him that 'humour leading to inaccurate statements is inadmissible,' and as his 'inaccurate statements' are inadmissible, we must assume that he is serious, which is regrettable. Dr. Villy, in his paper, admits that some of his 'arguments are of a rather circular nature.' The word 'rather' might have been omitted, and the opinion could then correctly apply to many of his others. To give merely one instance, on page 12 of his paper, he states: 'The stonework just described is built quite in the Roman style, and on several grounds we thus have distinct though *perhaps* not absolutely conclusive evidence that the Roman Road crossed Harden and Wilsden becks *almost* as the present road does.' From this we might assume that there was a possibility of a doubt, but when we come to the illustration of the stonework in question, it is labelled, 'Kerbed edge (northern) of Roman Road.' There is no doubt in this description, which is unfortunate, as the absurdly small heap of badly-fitting and irregular rounded cobbles, as shown in the photograph, might be scores of things. It certainly is not convincing as a Roman road. What is apparently the foundation of an old peat stack, or something as easily explainable, is described and figured as 'Supposed Roman Road.' Dr. Villy's description of these seven pieces of stone is as follows: 'The stones are laid directly on the slope of the subsoil, which (though not really hard to dig) has not been levelled. This would be a very slovenly and insecure way of laying the foundation of a dry wall, whilst for a kerb it would be a slight advantage.' The following sentence: 'Besides the point already alluded to beyond Keighley, this road has been recovered lately at Well Head on Glasburn Moor, whence its course *seems* to have been via Park Head and the Elslack Fort, Horton, and Paythorn, where it *perhaps* crossed the Ribble. But it has not yet been excavated satisfactorily beyond Well Head,' may also be taken as a sample of his style. We do not wish in any way to deprecate the good work our Bradford friends are doing, but the arguments and photographs brought forward in their last Journal are by no means convincing, and our point is that a little more definite and reliable evidence should be produced before all these old trackways are dubbed 'Roman.'—Ed.]

NOTES AND COMMENTS.

OLD GROUP OF GEOLOGISTS.

Among the papers belonging to the late Rev. E. Maule Cole, which the writer obtained by the kindness of Lady Philadelphia Cole, was an interesting photograph of a group of geologists, reproduced herewith. It was taken on the occasion of the excursion to East Yorkshire, held in connection with the International Geological Congress in 1888. It is of particular interest to readers of *The Naturalist* as it contains portraits of a number of workers in East Yorkshire geology,

Madame Pavlow. Rev. E. M. Cole. C. Fox-Strangways. M. Rivero.

Prof. Nikitin. Prof Pavlow. Prof. Beyrich. —— ——— A. del Castilio

— des Forges. Sir Chas. Strickland. S. Chadwick. W. H. Hudleston.

six of whom (Sir Chas. Strickland, S. Chadwick, W. H. Hudleston, des Forges, C. Fox-Strangways and E. Maule Cole) are no longer with us. Of some of them very few portraits are extant.

EARLY FLINT WEAPONS.

The Geological Society of London has recently devoted an evening to the discussion of various flint weapons and instruments which may or may not have been made by man. The report thereon is exceedingly interesting to read. Professor Boyd Dawkins opined that in dealing with the antiquity of man, ' it is necessary that the specimens on which it is based

should be clearly proved to be artefacts. This, in his opinion, has not been proved in the case of the Ipswich finds, on which Mr. J. R. Moir and Sir E. Ray Lankester based their conclusion that man was living in Suffolk in the Pliocene Age. The supposed artefacts are probably caused by the pressure of the dead weight of gravel on the move down the slopes, or by other pressure, such as that of ice. On the question of the age of the deposits in which they are found, the archæologists must refer to Geology as a final Court of Appeal. They have no right to invent glacial periods, or to correlate strata in Britain with the glaciers in the Alps.' The final speaker wished to urge caution upon Suffolk archæologists, and 'pleaded that they should carefully study the elementary geology of their district before indulging in the misstatements which had been frequent in recently-published archæological papers, and were in danger of bringing the science into disrepute.'

RINGING BIRDS IN THE SEVENTEENTH CENTURY.

The practice of placing rings on birds' legs is by no means a new one, though the silver rings referred to below were not used with any scientific object. At the sale of the collection of Roman coins, etc., formed by the late Thomas Smith (usually known as 'Coin Tommy'), of South Ferriby, Lincs., was a pair of small flat silver rings, one of which was inscribed HENRY

VISCOUNT on one side and DUMBER on the other. On the second ring were the words IN HOLDERNESS on one side and OF YORKSHIRE on the other. There was some competition for these silver rings, and eventually they came into the possession of a well-known London dealer. They were subsequently figured in Spink's Numismatic Circular as 'Engraved tokens in the form of rings.' The rings, however, appeared to be similar to those used in the seventeenth century for fastening to the legs of hawks used in falconery. Other examples of a similar kind are known and one or two have been figured in the early volumes of 'Archæologia.' The rings were found on the beach at South Ferriby and are doubtless all that remains of a falcon which had died there or been washed up on the beach many years ago. The Rev. C. V. Collier informs me that Henry Constable Viscount Dunbar, was a Yorkshireman by birth, though holding a Scotch peerage. He was one of the Constables of Burton and Halsham in the East Riding; and he was created Baron

Constable and Viscount Dunbar in the peerage of Scotland by James I. on the 14th November, 1620.

PUCCINIA MALVACEARUM.

In the *Memoirs and Proceedings of the Manchester Literary and Philosophical Society*, Mr. Wilfrid Robinson, B.Sc., has a paper 'On some relations between *Puccinia malvacearum* (Mons.) and the tissues of its host plant (*Althaea rosea*.' Attention has been devoted chiefly to the intimate relations between the fungus and the cells of the host, concerning which little research has been previously carried out, and to the histological features of the diseased part as compared with the corresponding normal tissues. The paper clears away much of the confusion that previously existed in regard to the behaviour of the haustoria of the fungus parasite. Mr. Robinson's research shows that the mycelium grows into the intercellular spaces of the host and sends haustoria into all the cells of the affected area, and that there is a definite attack on the phloem regions of the bundles. There is a definite diminution in the quantity of starch in the regions invaded by the fungus. One point clearly established was that the haustoria lie within the protoplasm, and grow towards the nuclei of the host cells, and no case of haustoria entering the vacuole was observed.

VARIATION OF THE HAUSTORIA.

It was found that the haustoria vary somewhat in form according to the character of the cell invaded. In the cells of the collenchyma and assimilating tissue they are generally forked, each branch growing towards the nucleus. In the cells of the starch sheath the haustoria are much more branched, the branches entering into close contact with the nucleus. No haustoria were observed in the sieve-tubes, though hyphæ were occasionally seen to pass into tracheids, but not to grow for any distance along them. Various changes, consequent on the entry of haustoria, were noted. The chloroplasts which were regularly arranged in the peripheral cytoplasm aggregate round the nucleus, lose their contour and colour, and finally disintegrate. The nucleus moves from its peripheral position towards the centre of the cell. There is a very distinct increase in the size of the nucleus, and the chromatin gradually diminishes in quantity. The results indicated that there was a slow tapping of the resources of the living cells by the fungal haustoria, which are able to penetrate the protoplasm in such a way that the cells remain alive for a considerable time.

GLACIATION OF EAST LANCASHIRE.

At a recent meeting of the London Geological Society Dr. Albert Jowett gave an account of 'The Glacial Geology

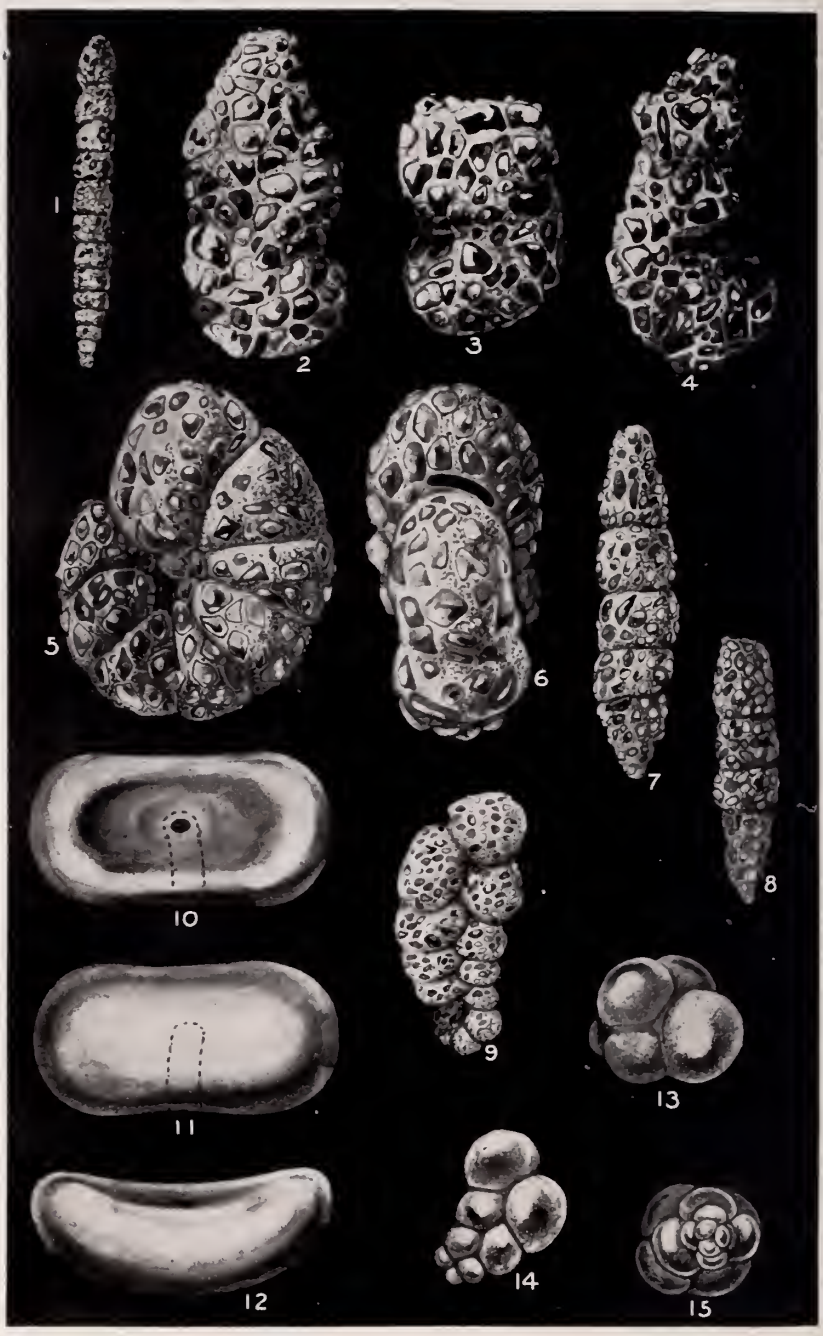
of East Lancashire.' The area dealt with comprises the western slopes of the Pennines, from Boulsworth Hill to Blackstone Edge, and their westerly offshoot, the Rossendale highland, which separates the basin of the Ribble from that of the Irwell and Mersey. Three types of drift have been recognized, (1) Local drift, consisting of materials which can be found *in situ* in the neighbourhood, chiefly Coal Measures and Millstone Grit ; (2) Ribblesdale drift with Carboniferous Limestone, chert, and Silurian grit, as well as local material ; (3) North-western drift which, in addition to any or all of the above-mentioned constituents, contains igneous rocks from the Lake District and the South-west of Scotland. The distribution of the drift and the evidence of striated rock-surfaces suggest the invasion of this area by an ice-sheet which reached up to the Pennine watershed, and projected ice-lobes across it through the gaps at Widdop, Gorple, Cliviger, and Walsden. A small unglaciated region occurs a few miles south-west of Todmorden.

DIRECTION OF ICE-MOVEMENT

In the north-eastern portion of the area the general direction of ice-movement was from north to south ; in the west it was from north-north-west to south-south-east, but on the south of the Rossendale highland the direction of flow curved round towards the east-north-east, and ultimately, in the neighbourhood of Rochdale, towards the north. The local drift is believed to have been produced by the overlapping of 200 feet or so of clean ice, which formed the upper portion of the ice-sheet, beyond the limits reached by the ice containing erratics. No evidence of local glaciation has been found. The limit of the north-western drift rises at the rate of about 4 feet per mile from Blackstone Edge towards the Irish Sea : therefore, when at its maximum, the ice-sheet was probably over 2000 feet above present sea-level in the middle of the Irish Sea in this latitude. Extensive systems of glacier-lakes and drainage-channels were produced on the retreat of the ice, and for some time the drainage on the west of the Pennines in the Ribble and Irwell basins escaped eastwards into the Yorkshire Calder. It is probable that the north-western ice arrived in this area later, and disappeared earlier, than the Ribblesdale ice. Some local fluctuations in the ice-sheet occurred, but there is no evidence for more than one Glacial Period.

NORTH SEA FORAMINIFERA.

Messrs. E. Heron-Allen and A. Earland have an interesting paper in No. 73 of *The Journal of the Quekett Microscopical Club*, 'On Some Foraminifera from the North Sea, Dredged by the Fisheries Cruiser "Huxley."' 133 species are enumerated, and some of these are illustrated. One of the plates



North Sea Foraminifera.

Fig. 1.—*Reophax nodulosa* Brady. × 120.
,, 2, 3, 4.—*Haplophragmium pseudospirale* Will. sp., × 40.
,, 5, 6.— ,, *crassimargo* Norman. × 20.
,, 7, 8.—*Clavulina obscura* Chaster, × 100.
,, 9 *Spiroplecta biformis* Parker & Jones. sp., × 120.
,, 10. *Lagena cymbula* Heron-Allen & Earland. Superior view. 250.
,, 11. ,, ,, ,, Inferior view, 250.
,, 12.— ,, ,, ,, Edge view. 250
,, 13, 14, 15.—*Globigerina rubra* d'Orbigny. × 120.

(plate VI.) we are kindly permitted to reproduce. The part also contains descriptions of *Arrhenurus scourfieldi* and *Accrcus longitarsus*, two new species of Water-mites, by C. D. Soar; the Collection and Preservation of the Hydroida, by G. T. Harriss; the Minute Structure of *Coscinodiscus asteromphalus* and of two species of Pleurosigma, *P. angulatum* and *balticum* by T. A. O'Donohoe; *Lagenae* of the South-west Pacific Ocean, by H. Sidebottom; and *Gastrotricha*, by James Murray.

THE VICTORIA HISTORY.

Some time ago we had the pleasure of referring to the first volume of *The Victoria History of Yorkshire*, a monumental work from the press of Messrs. Constable and Co. In that volume many Yorkshire naturalists gave the results of their studies. We have patiently awaited the appearance of further volumes of the same publication; and it was not until we saw a reference to a second volume in a second-hand catalogue that we were aware of its appearance. We certainly think so scholarly a work should be made known in some way. Though we see most of the current reviews and publishers' announcements, and have been on the watch for further volumes of this important work, we have not seen a single reference to it anywhere. Yet, when completed, it will be by far the finest account of the history of the county of broad-acres there has ever been, which is saying very much indeed.

EARTHWORKS AND ANTIQUITIES.

This second volume contains 550 pages, without plates and maps. It begins with a remarkable account of the ancient earthworks by Mrs. Armitage and Mr. D. H. Macdonald, with plans of dozens of our most important earth structures. Mr. R. A. Smith follows with an account of the remarkable series of Anglo-Saxon remains which the county has yielded, and Professor Collingwood describes the Anglo-Saxon sculptured stones. A remarkable and epoch-making contribution is Dr. W. Ferrer's account of Yorkshire in Domesday times.

EARLY MINING.

Perhaps the most unexpected account relates to the mining in the county, and to the fact that both coal-mining and iron-stone mining were practiced in the very earliest times. Mr. Villacott gives good evidence that coal was mined in the 13th century, whereas iron was smelted in Roman times. Mr. James Backhouse writes on lead mining in the county and even opines that galena was probably worked on the Yorkshire moorlands before the Roman days. He traces the ups and downs of lead mining in the county until quite modern times; the last phase being doubtless the acquiring of Mr. Backhouse's fine collection by the Hull Museum.

ALUM AND SALT.

Miss Maud Sellars, who has done so much in connection with the past history of our county, contributes some scholarly chapters on the alum, salt, pottery, glass and other Yorkshire industries, and really the amount of researches her contributions indicate should shame many of her contemporaries of the stronger sex. The only complaint we have to make is that she will invariably refer to a certain museum curator as *J.* Sheppard; evidently having in mind a possible ancestor of his, who was a notorious thief and quitted this world by being hung!

LATER HISTORY.

Later chapters refer to bell founders, agriculture, ancient and modern sports, and so on. The histories of the various hunts and athletic clubs are very interesting; and is an illustration of the thoroughness of the 'History,' there is even an account of the various Yorkshire Golf Clubs, though oddly enough the Bridlington Golf Club, which we know very well, is not mentioned, though several smaller ones are.

ECCLESIASTICAL YORKSHIRE.

The third volume of this work has also recently appeared, and is purposely devoted to an account of the ecclesiastical history of the county, a history such as is unequalled, though it unfortunately hardly comes within the scope of this journal. Among the contributors the names of the late T. M. Fallow, the Rev. J. Solloway and L. F. Salzman loom large, while Miss Sellers gives a social and economic history of the county, which contains an amount of research that few present day workers can appreciate. We should like to congratulate the publisher, and the editor, Mr. Wm. Page, on the volumes. It is impossible to do anything but praise them.

Ammonites elegantulus.
Young & Bird. 1828.

YORKSHIRE TYPE AMMONITIES.

We are pleased to see that this publication is favourably progressing towards completion. Part XII.* is before us, and contains illustrations and descriptions of *Ammonites verticosum*, *A. obsoletus*, *elegantulus*, *sinuatus*, *socialis*, *aureolus* and *costatum*. One of these is here reproduced.

* London: W. Wesley and Son, 3s. 6d.

CLAY-BALLS AND STRIATED PEBBLES, FROM BUNTER SANDSTONE, NOTTS.

HENRY PRESTON, F.G.S.
Grantham.

(PLATES VII. AND VIII.).

CONNECTED with the Bestwood Blast Furnaces, near Nottingham, there is a large sand-pit in the Pebble Beds of the Bunter Sandstone, which lies a little to the south-west of the Furnaces, and four miles north of Nottingham.

The vertical section of the sand-rock measures about 50 feet, and there are a few pebble bands scattered throughout the section.

The principal pebble bed varies from twelve to eighteen inches in thickness and occurs nearly half way up; but the rock is mainly a massive bed of yellowish cream coloured sand with occasional streaks and patches of light reddish brown. The colour of the sand-rock is due to thin pellicles of iron oxide surrounding the grains, which may readily be removed by boiling in acid.

Scattered about on the floor of the pit are numbers of clay-balls which have been thrown out during the excavations. They are mostly lenticular in shape; but some pieces are quite flattened out and others are disc-shaped. The surfaces of these balls are often studded all over with pebbles; white, and liver-coloured quartzites, and such others as are found in the pebble bands of the pit.

In the 'Geological Memoir for Newark and Nottingham, 1908,' page 37, mention is made of similar cakes and rolled lumps of clay among the quartzite pebbles of the Bunter pebble beds at Sneinton; and they are also mentioned in the 'Geological Memoir for Ollerton, 1910,' page 35.

In the Bestwood pit, some of the clay-balls occur *in situ* in the rock face, and they are generally in or near to the pebble bands. Occasionally the balls are found in the massive sand-rock well removed from any pebbles, when they are quite destitute of any adhering pebbles.

The probable explanation of the origin of these clay-balls will be understood when we consider what is taking place to-day. Wherever a clay cliff exists around our Coast, and there are pebbles on the beach, it is quite common to find masses of clay of various sizes which have been broken from the cliff and rolled about by the wash of the tide until they become more or less rounded in shape; and studded all over their surfaces are numbers of pebbles picked up from the shore. If the clay is rolled about on a simple sand-beach then the clay-balls are destitute of pebbles.

We thus have a modern illustration of what occurs in the

Bunter sand-rock. Subsidence and accumulation of sand explains the subsequent burial and preservation of the ancient specimens.

The properties of the clay or marl of which the balls are composed is somewhat peculiar. When first obtained, it is hard, and breaks with a sub-conchoidal and dicey fracture; but if some small pieces be placed in water they very quickly precipitate into an incoherent powdery mass. If this be washed and boiled in Hydrochloric acid it yields a white amorphous deposit, mainly of silica, the proportion being 75 per cent.

Also, most of the balls have a greenish-grey centre, and a thick, liver-coloured rind. The red rind contains 12 per cent of ferric oxide, and the grey centre from 3 to 4 per cent of the same oxide.

These considerations may not exactly point to the source of the clay, but it is noteworthy that the Permian Marl, which is now being worked in the neighbourhood, for flower pots, etc., is exactly similar in all these physical and chemical properties. It is 'dicey' in character; it falls into a powder when placed in water; and when treated with acid it yields about 75 per cent of an amorphous residue. The Permian Marl is also dark red in colour, containing about 12 per cent of Iron oxide; and there are green-grey bands in the rock which yield about four per cent. of the same oxide.

From all this there is a strong temptation to suggest that, in Bunter times, an ancient cliff of Permian Marl existed close at hand, from which the balls originated. And yet there are no indications of a buried cliff of Permian Marl. In this district these marls lie buried beneath the Lower Mottled Sandstone, and were there long before the Bunter Pebble Beds were formed.

There is, however, another consideration which may assist us. In the Bunter Pebble Beds of Nottinghamshire, it is common to find bands of marl a foot or more in thickness of quite a similar character to that of the clay-balls, and when these marl bands are seen in section they are generally found to be lenticular in shape. They were evidently deposited by stagnant waters in hollows of the surface after seasons of flood, and represent matter carried down in suspension. These marly sediments would be baked hard and subsequently buried beneath banks of sand. Other floods would tear up the earlier formed sand-banks, together with the lenticles of hardened mud, and some of this hardened mud would be rolled about and deposited amongst the pebbles, and again buried. Subsequent pressure has further moulded them into the pebble-shaped clay-balls, with the attached quartzites and other rock pebbles.

The great similarity of the clay of the balls and the Permian

Group of Clay-balls, with embedded Pebbles,
Bestwood Sand-pit.

Bestwood Sand-pit in Bunter Pebble Beds.

Microscopic enlargement of Striæ on Pebble, showing "pitted" surface.

Recent. Ancient.

Clay-balls.

Marls would at least suggest a similar source of origin for the two, whatever that source may be.

When the clay-balls occur *in situ* it is often seen that a zone of white sand, from one-eighth to a quarter of an inch in thickness, surrounds the ball, while the general mass of sand is its normal yellowish-cream colour. As has been already noticed, the balls themselves are also dark red, with a greenish-grey centre. It would therefore seem that a process of leaching has been taking place in the clay throughout the ages, whereby the iron in the clay has been oxidised and brought to the outer rim of the clay-ball in a similar manner to that in which the "ironstone-boxes' have been formed in the Northampton sands and other ironstones.

In a similar manner the zone of white sand has been formed by the small quantity of iron which there surrounded the sand-grains, leaching out, or by being subject to molecular attraction by the zone of rich oxide in the clay.

The leaching of the iron is probably subsequent to any movement in the clay, otherwise the remarkably clear and uniform line dividing the red and grey coloured marls would have been disturbed.

Notwithstanding this clear line between the two colours, however, there are features in the clay which do indicate pressure and movement.

In certain parts of the pit there are groups of small masses of clay which have been squeezed into flat lenticular slabs, and these are generally inclined in a kind of false-bedding plane. This may be due to creep in the rocks, or it may be due to more violent slip soon after the clay fragments were buried. But the most important movements are indicated in the clay-balls themselves.

Careful examination of the balls shows that some few of the pebbles are totally embedded within the clay. The great pressure brought to bear on the clay after being buried in the sand has so crushed and moved it that some of the studded pebbles have been forced quite into the body of the marl.

As far as I have been able to ascertain, none of the modern clay-balls contains beach pebbles within the mass,* but only on the surface. Also, in broken Bunter specimens we find slickensided, streaky pieces of clay dividing the pebbles, indicating that the clay has been squeezed into its present position among the pebbles by considerable pressure; something like a ball of putty would be forced through the fingers when pressed in the hands.

Having noticed that the clay has moved thus within itself, we may next examine the included pebbles more closely. We

* Excepting, of course, such as were originally in the boulder-clay, when these clay-balls are composed of that material.

soon find that the moving clay has left very definite effects on the pebbles, as they are both polished and striated. Those which are wholly immersed in the clay are more or less polished all over, and of those which are studded on the outside, the parts embedded in the clay are polished, while where not so embedded they retain their normal roughness. This polish I consider to be due to the moving clay under great pressure. When we break up one of these masses and examine the contained pebbles, it is quite interesting to notice the degree of polishing which they have received according to the quality of the pebble and its position in the clay-ball. For instance, a fine grained quartzite pebble will have quite a greasy sheen upon it, whereas a coarser grained liver-coloured quartzite will only have its polish distinguished by comparison with pebbles from the ordinary pebble-bands; or, in case of those sticking on the outside of the clay, by noticing the difference between that portion embedded and that not so embedded in the clay.

It has been suggested that the polish is due to a thin deposit of silica on the surface of the pebble, but this I hardly think to be the case.

Ordinary quartzite pebbles often have small 'pits' on the surface. If the polish were due to a deposit of silica it is fair to suppose that these 'pits' would get a share of the varnish and also be polished, but this is not so. All the little 'pits' remain dull and unaltered, the polish occurring only on the general surface.

Let us try and picture to ourselves what has happened. Great pressure would be exerted on the clay-balls by superincumbent strata, and the clay would be pressed hard against the surface of the pebbles and into every microscopic 'pit' on such surface; from some cause or other motion has then taken place in the clay, and the two surfaces of clay and stone have moved on each other in a kind of shearing plane, and the clay fillings in the little pits have been slid over and not moved.

Again, when an embedded pebble lies flat in a lenticular clay-ball, the flat surfaces of the pebble, or those subjected to the greatest pressure, are polished more than the outer edges where the pressure is less direct. Had the polish been due to deposited silica, then the edges should show an equal polish with the flat surfaces. True, sometimes the edge of a stone is the most polished, but this is wholly because of its position, and this only demonstrates that the polishing is due to friction.

When examined under the microscope, or by a good pocket lens, many of the pebbles exhibit a well striated surface, sometimes across the stone, sometimes lengthwise, but the striæ never cross each other.

In every case these striæ occur on the polished surface and never on that part which has not been embedded in the clay. Indeed, it often occurs that the little pittings on the stone have been filled in with compressed clay, and the moving clay has ridden over these particles of compressed clay and dug into the stone on the opposite side, thus producing microscopically grooved hollows which bring to mind some of the most interesting effects of glaciation.

Another suggestion has been made, viz., that the polished pebbles are in their natural condition as they occurred on the Desert Sand in Bunter times, and that being embedded in the clay has preserved them from being subsequently roughened by continual movement in the sand.

But the little grooved hollows just mentioned are contrary to this idea, because they show cutting as well as polishing, and again under the miscroscope it is seen that the surface has been dug into by the moving clay, i.e., polishing has *reduced* the surface of the stone, and this is quite contrary to what we should expect if the polish were the original condition.

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The Nature and Origin of Fiords, by J. W. Gregory, F.R.S. London: John Murray. Pp. xvi+542, 16s. net. In addition to his ordinary professional duties, and lectures and papers and addresses innumerable, Professor Gregory seems to find time to prepare substantial monographs on various phases of geological research. His 'Great Rift Valley,' and 'The Dead Heart of Australia,' are perhaps the best-known of his many contributions. Those who know him will admire his thoroughness. No matter what subject he takes in hand (and their variety is marvellous), when he has thrashed it out his decision may usually be safely said to be the 'last word.' His Fiord volume is really a sequel to his 'Great Rift Valley.' Professor Gregory will not agree that fiords are the result of glacial action nor of other ordinary erosive agencies. 'Their plan resembles that of cracks in a fractured sheet of brittle material, and does not agree with that of systems of valleys cut by rivers or glaciers. Fiords are restricted to plateaus, which are composed of firm and usually old rocks, and to districts which are on the borders of sunken areas. All the fiord-areas have been affected by a similar succession of earth movements.' He considers that the fact that most of the fiords are in colder regions of the earth is a coincidence due to the polar areas having been affected by greater oscillations than the equatorial zone. It is possible there may be differences of opinion on the point. However, as evidence of Professor Gregory's methods, not only has he visited Norway and Spitsbergen—countries usually looked upon as the home of the fiord—but he has been to Brittany, the West Indies, New Zealand, the Baltic, British Columbia, and Dalmatia, besides several Scottish localities. In addition to his personal observations Professor Gregory has mastered the literature on the subject—a bibliography of which is given—and which would alone have been enough for most people! Whether Professor Gregory's ideas receive universal acceptance or not—and he always has a strong following—all will admit that his Fiord book is a distinct and welcome addition to geological and geographical science. It is well illustrated and well indexed.

YORKSHIRE ARACHNIDA IN 1912-13.*

WM. FALCONER,
Slaithwaite, Huddersfield.

RECENTLY the very closely allied species of the Genus Porrhomma have been revised by Dr. Jackson.† By carefully comparing the type specimens with those in various collections he has been able to clearly define the identity and characteristics of each species, to remove the invalid ones and add three others to the British list. The latter, *P. thorellii* Herm., *P. montanum* Jacks., and *P. pallidum* Jacks., are all indigenous to Yorkshire, but the two last have hitherto been combined under another name, leaving a balance of two, which with six others make an addition to the county list of eight species for the years 1912-3, and a grand total of 317, a number exceeded only by Dorset.

Mr. Winter and I have devoted a little attention to the mites. Most of the earthmites have in the first instance at least been named by Dr. George, and the beetle mites by the Rev. J. E. Hull, who has also supplied the list of Cleveland mites of the latter group, which is incorporated with others to form the general list which follows.

I.—NEW TO THE COUNTY LIST.

A.—SPIDERS.

Hahnia pusilla C. L. Koch.—One ♀, Shackleton Wood, Hebden Bridge, June 1913. The only other place in the British Isles where this spider has been found is Delamere Forest, Cheshire.

Porrhomma thorellii Herm.—Both sexes in the cellar of a house, Slaithwaite, and in the open at Drop Clough, Marsden, and Shackleton Wood, Hebden Bridge. It is on record for Northumberland, Cumberland, Durham, Somerset, and Ireland, but has hitherto been confounded with *P. microphthalmum* Camb.

P. pallidum Jacks.—Scarborough, Rev. R. A. Taylor; in most of the woods in the Huddersfield district; Hebden Bridge; Hardcastle Crags.

P. montanum Jacks.—In the cloughs and on the moors in the Huddersfield district; on the summit of Ingleborough. Both this and the previous species have been confounded either with *P. pygmæum* Bl. or *P. oblongum* Camb.

Agyneta subtilis Camb.—Chandler's Whin, York, 2 ♀s, June 1912. The spiders recorded under this name in Mr. Harrison's "Spiders of the Middlesbrough District," in Trans. Cleveland Nat. Hist. Soc. were *A. cornigera* Camb.

Thyreosthenius biovatus Camb.—Denby Dale, near Huddersfield, August 1912, an adult male from nests of *Formica rufa*. This myrmecophile has occurred in Surrey, Sussex, Durham, and Northumberland.

Walckenæra capito Westr.—One ♀, beneath a stone on the summit of Ingleborough, June 1913. A very rare British spider which has occurred in Dorset, Cumberland, and Scotland.

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* For previous list see *The Naturalist* for February 1912, pp. 52-4.

† Trans. Nottingham Naturalists' Society for 1911-12, pp. 30-46.

W. nodosa Camb.—Two ♀s, in moist ground, above Clapdale, Ingleborough, June 1913. A very rare British spider on record for Northumberland, Dorset, and Ireland (Monaghan).

Trochosa robusta Sim.—Eston, an adult male, taken in 1911 by Mr. J. W. H. Harrison, and identified by the Rev. J. E. Hull in 1912. Previously reported only from Dorset, but Mr. Hull has since found it on the Tees Estuary in County Durham, and I have also seen a specimen from Cornwall.

II.—ADDITIONAL RECORDS FOR RARER SPECIES.

Prosthesima petiverii Scop.—Female, nearly mature, Malham, September 1912 (F. Booth). New to West Riding.

Chiracanthium carnifex Fabr.—Two adult females, Whitby Moors (Rev. R. A. Taylor) ; so far only found in three Yorkshire localities.

Dictyna uncinata Westr.—Both sexes, Burley-in-Wharfedale (W. P. W.), on gorse. There are no records yet for the western hill districts.

Amaurobius ferox Walck.—One ♀, Saltaire (P. K. Winter) ; 1 ♂, Heeley, Sheffield (T. W. Wilshaw).

Hahnia nava Bl.—One ♂, Langdale End, Forge Valley (R. A. T.), the third Yorkshire specimen and first male.

Theridion pictum Hahn.—Chandler's Whin, York, both sexes abundant on gorse. New to North Riding.

T. tepidariorum C. L. Koch.—Scarborough (R. A. T.). The very common greenhouse spider, yet this is apparently the first record for the North Riding.

Onesinda minutissima Camb.—Eston (J. W. H.) ; Ringingkeld Bog, Cloughton (R. A. T.) ; Marsden Clough, Holmfirth ; Lower Stones Wood, Stocksmoor.

Robertus neglectus Camb.—One ♂, Barrett Clough, Slaithwaite.

Hillhousia misera Camb.—Eston (J. W. H. Harrison).

Porrhomma egeria Sim.—One ♀, Dunford Bridge, S.W. Yorks. Elsewhere in Yorkshire found only, but very rarely, in the Colne Valley.

Centromerus arcanus Camb.—Both sexes, abundant in Scout Wood, Slaithwaite, and less so in Drop Clough, Marsden, and Lower Stones Wood, Stocksmoor.

Phaulothrix hardii Bl.—One ♀, Eston (J. W. H.). New to North Riding ; 1 ♀, Drop Clough. Outside the Huddersfield district only one other example, a ♂, has so far been taken in Yorkshire, in King Wood, Adel, near Leeds.

Diplocentria rivalis Camb.—Nont Sarah's and Wholestone Moor, near Slaithwaite ; Dunford Bridge, 1 ♂.

Coryphæus distinctus Sim.—Both sexes, flotsam, banks of the Aire, between Saltaire and Cottingley, April 1913 (W. P. W.). New to the West Riding.

Gongylidiellum latebricola Camb.—Honley Old Wood, Huddersfield, 1 ♂, 3 ♀s. A rare British spider, the only other Yorkshire localities being Brogden Wood, Soyland, and Chew Valley, Greenfield, both in South-west Yorks.

G. vivum Camb.—One ♂, Ringingkeld Bog, Cloughton (R. A. T.).

Sintula cornigera Bl.—Three ♀s, Ringingkeld Bog (R. A. T.) ; 3 ♀s, Shackleton Wood, Hebden Bridge ; 1 ♂, Lower Stones Wood, Stocksmoor. A rare spider everywhere.

Maro minutus Camb., and *M. falconerii* Jacks.—Both sexes, Ainley Place, Slaithwaite. So far the former has not been found anywhere else in the world than in three Huddersfield localities, the other two being Scout Wood, Merridale, and Drop Clough.

Erigone graminicola Sund.—Two ♂s, 1 ♀, Chandler's Whin, York. New to the North Riding.

E. atra Bl., var. *lanc[illegible]nsis* Sim.—One ♂, Spurn. New to the county.

Typhochrestus digitatus Camb.—Two ♀s, Wholestone Moor, Slaithwaite; 1 ♀, Spurn. Outside the Huddersfield district one other ♂ is on record for Bielsbeck (East Riding) and 1 ♀ for Eston (North Riding).

Diplocephalus beckii Camb.—Two ♀s, in garden, Saltaire (W. P. W.); Wilberlee, 5 ♀s in a barn, and 1 ♂, Ainley Place Wood.

D. protuberans Camb.—Three ♀s, Ainley Place and Clough House Woods. Elsewhere in Britain reported for County Durham.

Hypselistes florens Camb.—Eston, a mile from the previous station (J. W. H.). There is some possibility of this North American species being lost to the British fauna by drainage operations.

H. jacksonii Camb.—Eston (J. W. H.), the only Yorkshire station for this rare spider.

Entelecara thorellii Westr.—One ♂, Langdale End, Forge Valley (R. A. T.). The other Yorkshire localities are Riccall Common and Eston.

E. trifrons Camb.—One ♂, Spurn. New to East Riding.

Lophocarenum mengii Sim.—Both sexes, Ringingkeld Bog (R. A. T.); frequent on moors in Huddersfield district in moist places.

L. nemorale Bl. Three ♂s, 3 ♀, near Ringingkeld Bog (R. A. T., the first Yorkshire males; Spurn, ♀s.

Minyriolus pusillus Wid.—Both sexes, Ringingkeld Bog (R. A. T.); Drop Clough. Not yet on record for East Riding.

Metopobactrus prominulus Camb.—Deffer Wood, Cawthorn, ♀s.

Cnephalocotes elegans Camb.—Both sexes, above Clapdale, Ingleborough.

Tapinocyba præcox Camb.—One ♂, Spurn; Wholestone Moor, near Slaithwaite, 2 ♀s.

Widera fuga Camb.—One ♂, Raincliff Woods, Scarborough (R. A. T.), new to North Riding; Scout Wood, Slaithwaite, 1 ♀. All the other Yorkshire records are from the Huddersfield district. A very rare British spider.

Cornicularia unicornis Camb. One ♂, Burley-in-Wharfedale (W. V. V.). No records for the western hill districts.

C. vigilax Bl. Wholestone Moor, near Slaithwaite, several males and females, new to West Riding. Two females have only previously been taken in the county (North Riding).

Ceratinella brevis Wid.—Riccall Common (W. P. W.), new to East Riding.

Pachygnatha listeri Sund. One ♂, Ledsham, near Castleford (S. Margerison); Lepton Great Wood, Huddersfield, 2 ♀s.

Cercidia prominens Westr.—One ♀, Skipwith Common, new to East Riding. There are only two other northern records of this spider, viz., Berwick and Leeds.

Epeira cucurbitina Clerck.—Chandler's Whin and Askham Bog, York. New to North Riding.

Oxyptila atomaria Panz. Eston (J. W. H.). New to North Riding. Previously reported from three localities in East Riding.

O. praticola C. L. Koch.—Chandler's Whin, York, 2 ♀s. New to North Riding. Now on record for all the three political divisions.

Micrommata virescens Clerck. ♀s (Messrs. Sutcliffe, Butterfield, Fisher, and Sanderson), Crass Woods, Grassington, the only northern station for this southern species.

Evarcha falcata C. L. Koch. Grass Woods (Mr. Sanderson); Deffer Wood, Cawthorn.

B.—Harvestman.

Nemastoma chrysomelas Herm.—Staintondale and Scarborough (R. A. T.); Ainley Place Wood and Lower Stones Wood.

C.—Pseudoscorpions.

Chthonius tetrachelatus Preyss.—Two examples, garden in Shipley from the deepest holes of a wall behind ivy, under the débris of dead leaves (W. P. W.); Spurn, several from grass around the base of sea buckthorn near the lighthouse.

Chernes nodosus Schr.—One example (Mr. Tankard), Hull, and another, Falsgrave, Scarborough (R. A. T.), both attached to the legs of flies. Other Yorkshire specimens similarly placed had previously been taken at Leeds and Bradford.

C. panzeri C. L. Koch.—One example beneath a stone, Ingleton (T. Booth).

D.—Mites.

In Yorkshire the study of mites has been entirely neglected, and in all probablility the following, with a few obvious exceptions of earlier date taken from various sources, which are named, are new to the county. The contractions used in the Rev. J. E. Hull's list of Cleveland Oribatidæ are:—E, Eston: 1, dead wood; 2, moss on the ground. L, Lonsdale: 1, swamp; 2, moss in heather; 3, pine needles; 4, moss under conifers; 5, lichen on wall. A, Great Ayton: lichen on fence.

Oribates globulus Nic.—E1, E2; Ainley Place, Slaithwaite.

O. edwardsii Nic.—E2, L2.

O. quadricornutus Mich.—E1.

O. cuspidatus Mich.—A; L1.

O. furcatus Prce. and Warb.—Austwick Bog, Clapham (*Proc. Zool. Soc.*, 1905.)

Tegeocranus cepheiformis Nic.—L1.

T. latus C. L. Koch.—E1.

T. velatus Mich.—L3.

Carabodes labyrinthicus Mich.—L5.

C. marginatus Mich.—A; L5.

Liacarus ovatus C. L. Koch.—L2; Ainley Place, Slaithwaite.

L. bicornis Prce. and Warb.—Austwick Bog, Clapham (*Proc. Zool. Soc.*, 1905).

Notaspis bipilis Herm.—Cleveland, everywhere (J. E. H.).

N. oblonga C. L. Koch.—L5.

N. splendens C. L. Koch.—L1.

Damæus geniculatus C. L. Koch.—E2; Ringingkeld Bog, Cloughton (R. A. T.).

D. auritus C. L. Koch.—L3.

D. clavipes Herm.—L1, L2; Ringingkeld Bog (R. A. T.); Barrett Clough, Slaithwaite.

Hermannia bistriata Nic.—L1.

H. convexa C. L. Koch.—E2, L1.

Nothrus horridus Herm.—L1.

N. palustris C. L. Koch.—L1.

N. segnis Herm.—L3, L4.

N. spinifer C. L. Koch.—L1, L3, L4.

N. silvestris Nic.—L2.

N. bicarinatus C. L. Koch.—L, beaten from spruce.

N. requis Mich.—'Yorkshire Hills,' (*Michael's Oribatidæ*).

Haploderma dasypus Dug.—E1, L1, L2, L3.

H. magnum Nic.—L3, L4.

Gamasus coleopteratorum C. L. Koch.—The common mite parasite on beetles; Dungeon Wood, Shipley (W. P. W.); Wilberlee, Slaithwaite.

G. ignotus George.—One example, Shackleton Wood, Hebden Bridge, June 1913. The example recorded for Kirkby Stephen (*The Naturalist*, July 1913, page 260) is apparently referable to the Westmorland area, and not to Yorkshire. (See *The Naturalist*, March 1913, pp. 139-140).*

* References to Dr. George's papers, but not to Yorkshire mites.

G. vegetans Degeer.—One example, Wholestone Moor, near Slaithwaite, July 1913.

Bdella vulgaris Herm.—Ainley Place, Slaithwaite, October 1913.

Trombidium holosericeum Linn.—Seven Arches, Saltaire, April 1911 (F. Booth); two examples, Spurn. (See *The Naturalist*, Sept. 1908, p. 333).*

T. mushami George.—Selby (Mr. Musham), recorded, figured, and described in *The Naturalist*, November 1913, pp. 383-4.

T. bicolor Herm.—Several examples along the course of the Ainley Place Beck from Barrett Clough to Clough House Wood; and one in Lower Stones Wood, Stocksmoor, October and November, 1913. Reported so far from one other British locality, Canwick, near Lincoln. (See *The Naturalist* for November 1913, page 384* and January 1914, page 11.)

Ottonia bicolor Herm.—Nont Sarah's, near Slaithwaite, and Ainley Place, May 1913. (See *The Naturalist*, February 1910.*)

It is quite evident from the nomenclature that there is some confusion of identity between this and the previous species. I referred the difficulty to Dr. George, and the following notes are based, with his kind permission, on his reply. He is personally of opinion that they are distinct mites, and that Hermann never described the so-called *O. bicolor*, which he (Dr. George) published a few years ago on the authority of Professor Borlese, to whom he submitted a specimen. In many respects the two mites agree pretty well in their anatomy, but to his mind there can be no doubt of their being distinct, unless it can be shown that *O. bicolor* is *T. bicolor* in an early stage of nymph. This, however, he does not think to be the case, so that failing direct proof by breeding, *O. bicolor* will require to be re-named.

O. clavata George.—Ingleton, 1912 (F. B.). (See *The Naturalist*, December 1909).*

O. sheppardii George.—'Yorkshire localities,' not specified, recorded in *The Naturalist*, 1913 (Aug.t pp. 287-8); two examples on the summit of Ingleborough, June 1913. I have also taken it in Wicken Fen, Cambridge.

Rhyncolophus communis George.—Keighley (R. Butterfield); garden at Saltaire, and in Hurst Wood, Shipley (W. P. W.); Grassington (Mr. Johnson); Chandler's Whin, York. (See *The Naturalist*, December 1910, pp. 427-8, and October 1912, pp. 304-5).*

R. niger George.—Rivock, Keighley (W. P. W.)—recorded in *The Naturalist*, August 1912, p. 252—the type specimen. It is wrongly entered as *R. communis* George in the Index for the year, December, p. 396.

Ritteria nemorum Koch.—Cottingley Wood, Hurst Wood, Elslack, gardens at Saltaire, Shipley Glen (W. P. W.); Barrett Clough, Ainley Place, Clough House Wood and Scout Wood, Slaithwaite; Lepton Great Wood, Huddersfield; Deffer Wood, Cawthorn; Shackleton Wood, Hebden Bridge; summit of Ingleborough. (See *The Naturalist*, May 1907, October 1912, and February 1913).*

R. mantonensis George.—One example, Ainley Place, September 1913.

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* References to Dr. George's papers, but not to Yorkshire mites.

Only one other is on record, from Manton, Lincolnshire. (See *The Naturalist*, October 1907, page 357).

Smaris (*Calyptostoma*) *hardyi* Camb.—One, Morton Wood, Holmfirth, July 1912; Ainley Place, three; Lepton Great Wood, one. (*Annals and Mag. Nat. Hist.*, Vol.XVI. (Fourth Series), page 384; *Science Gossip*, 1879, November, page 249*; *The Naturalist*, February 1907, pp. 41-44).*

Ixodes reduvius Linn.—Two females, Wilberlee, Slaithwaite, on a cow lately imported from Wales. (See *Science Gossip*, July 1901, p. 39.)

I. putus Camb.—Yorkshire (Nuttall and Warburton's Monograph, 1912). A parasite on seabirds (guillemots, razorbills, puffins, herring gulls, kittiwakes), and equally common in both the Arctic and Antartic regions. (See *Science Gossip*, August 1901, page 71.)

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Mr. A. W. Slocum illustrates some remarkable new forms of trilobites from the Maquoketa beds of Iowa in Publication 171 of the *Field Museum of Natural History*, Chicago.

Mr. R. W. Goulding sends us a paper read before the Louth Antiquarian and Literary Society, entitled 'Four Louth Men: An Abbot, a Monk, a Physician and a Schoolmaster,' namely Richard de Dunham, William de Tournay, John Jones and William Walker.

We have received from Mr. A. L. Thomson a valuable First Interim Report (1909-1912) of the "Aberdeen University Bird Migration Enquiry." The Report includes methods of ringing the birds, scope of work, and details of results. It is reprinted from the *Scottish Naturalist*.

We have received from the Hastings Museum their 'Occasional Notes, No. 2,' which include many folk-lore, etc., items, and an admirable and well illustrated catalogue of an exhibition of British Needlework from the sixteenth century onward. The first is sold at 1d., and the second at 1s.

The *Marine Biological Association of the West of Scotland* favours us with its *Annual Report* for 1912, from which it appears that there is a large deficit on the year's work, and it has not been possible to make use of the S.Y. 'Mermaid.' This excellent institution certainly ought to be better supported.

The Geological Society of London this year awards its medals and funds as follows:—Wollaston Medal, Dr. J. E. Marr, F.R.S.; Murchison Medal, W. A. E. Ussher; Lyell Medal, C. S. Middlemiss; Wollaston Fund, R. B. Newton; Murchison Fund, F. N. Haward; Lyell Fund, Rev. W. Howchin and J. Postlethwaite.

The *Report of the Natural History Society of Norhumberland, Durham and Newcastle-upon-Tyne* shows that considerable progress has been made during the year, though the Curator still complains of the way the work is handicapped on account of the shortage of funds. He also records a falling off in attendance at his lectures. The Society contemplates a card index of the fauna and flora of Northumberland and Durham.

We have had the following news recently sent to us from an East Yorkshire paper; probably the bird referred to is allied to Darwin's famous 'hum-bug.':—'North Cliffe.—A Bird Visitor.—A very rare bird has put in an appearance at North Cliffe (Hotham), and can be seen at the residence of Mr. and Mrs. J. Sykes, where it has taken up its residence. It is a humming bird, and is about the size of a pigeon, and has a gutta percha ring round the right foot, on which is inscribed "57 a—a." This bird can be heard humming at frequent intervals.'

* References to Dr. George's papers, but not to Yorkshire mites.

THE BEETLES OF SCARBOROUGH.

E. CHAS. HORRELL.

THE following additional species and varieties have been met with in the Scarborough district as defined in my first note in *The Naturalist* for February 1912, since the publication of my second note in February 1913. I am again indebted to Mr. W. E. Sharp, and Mr. E. G. Bayford, for very kindly confirming or correcting my determinations of every specimen. The total number of species and varieties of beetles now recorded for this district is 1146.

Unless otherwise noted, all the following have been collected by myself:—

Notiophilus biguttatus F. *Forma.* Scarborough. Form with two pores on middle of right elytron.

Ditto. *Forma.* Scarborough. Form with two pores close together on middle of left elytron.

Ditto. *Forma.* Ebberston (*leg.* E. A. Wallis). Two equidistant pores on left elytron.

Nebria livida L. *Forma.* Scarborough. (W. Pearson.) An almost black example in company with normally-coloured specimens.

Notiophilus hypocrita Putz. Yedmandale.

N. substriatus Wat. Ringing Keld Bog.

Elaphrus riparius L. Forge Valley.

Bradycellus harpalinus Dej. Cloughton; Ringing Keld Bog.

Harpalus æneus F. *Forma.* Yedmandale. A very small form.

Ditto, ab. *melas* De Torre. Yedmandale. Upperside black.

Ophonus rufibarbis F. Bempton; Forge Valley.

Pterostichus vitreus Dej. Silpho Moor.

P. oblongo-punctatus F. Raincliffe Woods.

Amara acuminata Pk. *Forma.* Bempton. A melanic form with the antennæ black.

Calathus micropterus Duft. Given Dale. Abundant in March in fallen tree trunk not much above sea level.

Europhilus thoreyi Dej. Raincliffe Woods. One example in rotten tree stump in bog in company with *E. fuliginosus* Pz. (abundant), *E. thoreyi* Dej. ab. *puellus* Dej. (*Anchomenus puellus* Dej.) (in numbers), and *E. gracilis* Gyll (two specimens).

Bembidium atrocæruleum Steph. Langdale End.

B. mannerheimi Sahl. Raincliffe Woods.

B. affine Steph. *Forma.* Forge Valley. A small form.

B. testaceum Duft. Forge Valley.

Dromius melanocephalus Dej. Langdale End.
D. meridionalis Dej. Raincliffe Woods. (A. S. Tetley.)
Cœlambus impresso-punctatus Sch. Hackness.
Hydroporus nigrita F. Scarborough.
H. melanarius Sturm. Langdale End.
Agabus unguicularis Thoms. *Forma.* Beedale. (E. A. Wallis.) A curious form of the female with a very distinct red spot on each elytron.
Philydrus testaceus F. Cayton Bay.
Hydræna longior Rey. Langdale End. (W. C. Hey.)
Laccobius bipunctatus F. Cayton Bay.
Sphæridium scarabæoides F. var. *lunatum* F. Hellwathbeck. In this variety the usual humeral spot is absent.
Aleochara lanuginosa Gray. Raincliffe Woods.
Ocypus brunnipes F. *Forma.* Forge Valley. A melanic form with almost black legs.
Xantholinus ochraceus Gyll. Raincliffe Woods ; Given Dale.
Lathrobium geminum Kr. Sleights.
Stenus subæneus Er. Cloughton.
S. ossium Steph. Raincliffe Woods.
S. melanopus Marsh. Filey.
Bledius terebrans Schiod. Whisper Dale. (Dr. Joy determinavit.)
Oxytelus sculptus Grav. *Forma.* Low Dale. A melanic form.
O. nitidulus Grav. *Forma.* Low Dale ; Raincliffe Woods. Melanic forms.
Lesteva pubescens Mann. Whisper Dale.
Micralymma brevipenne Gyll. Scarborough, on coast.
Anthobium sorbi Gyll. Raincliffe Woods.
Anisotoma calcarata Er. var. *nigrescens* Fleish. Yedmandale. In this fine and distinct variety the head, thorax, and frequently the suture are dark brown.
Hister succicola Thoms. Raincliffe Woods.
H. unicolor L. Raincliffe Woods.
Saprinus æneus F. Hackness.
Scaphisoma boleti Pz. Cayton Bay. (Rev. R. A. Taylor.)
Thymalus limbatus F. Raincliffe Woods.
Rhizophagus dispar Pk. var. *punctulatus* Guilleb. Langdale End. Reitter in Fauna Germanica, iii. 41 (1911), considers that *R. punctulatus* Guilleb. is only the unicolorous rust-red form of *R. dispar* Pk. The European Catalogue (1906) considers *R. punctulatus* Guilleb. to be a synonym of *R. oblongicollis* Bl.
Scaphidium 4-maculatus Ol. Forge Valley.
Cerylon histeroides F. Forge Valley.
Lathridius Bergrothi Reitt. Scarborough, in basement of house used as carpenter's workshop (Rev. R. A. Taylor.)
Corticaria elongata Humm. Low Dale.

Cryptophagus setulosus Strm. Scarborough. In grocer's shop. (L. Dickons.)

Lacon murinus L. Forge Valley.

Limonius minutus L. Yedmandale.

Agriotes sputator L. Seamer Moor.

Athous hirtus Herbst. Langdale End. This is probably the species already recorded for this district under the name of *A. niger* L., which must be deleted.

Corymbites quercus Gyll. var. *ochropterus* Steph. Langdale End.

C. cupreus F. var. *æruginosus* F. Yedmandale.

Podabrus alpinus Pk. var. *rubens* F. Yedmandale. According to Reitter, l.c. iii. 255, the type form has the thorax black with broad yellow lateral margins. The var. *rubens* F. has the thorax entirely brown-yellow, and the hind femora in part dark.

Ditto, var. *lateralis* Er. Raincliffe Woods. In this variety the elytra are black with yellow margin, and the thorax is unicolorous reddish yellow. (Kuhnt, Illust. Best.-Tabellen, 447, 1912.)

Cantharis rufa L. ab. *liturata* Fall. Yedmandale.

Rhagonycha unicolor Curt. Yedmandale.

Necrobia ruficollis F. Scarborough. (W. Pearson.)

Ptinus tectus Boield. Scarborough. Crawling on pavement.

Anobium paniceum L. Scarborough. In dog-biscuit in grocer's shop. (E. A. Wallis.)

Aromia moschata L. Langdale End. (W. J. Clarke.)

Rhagium inquisitor F. Raincliffe Woods. (D. W. Bevan.)

Longitarsus anchusæ Pk. Langdale End.

Phyllotreta atra Pk. Raincliffe Woods.

Batophila rubi Pk. Yedmandale.

Mantura rustica L. var. *suturalis* Weise. Raincliffe Woods.

Chrysomela varians Schall. ab. *pratensis* Weise. Ringing Keld Bog. This is the blue or violet form. Reitter, l.c. iv., 116.

Ditto, ab. *centaurea* Herbst. Ringing Keld Bog. This form is coppery-red with bronze sheen. (Reitter l.c.) and has the underside greenish. (Kuhnt l.c. 843.)

Scaphidema metallica F. Hackness.

Rhinomacer attelaboides F. Raincliffe Woods.

Apion cruentatum Walt. Langdale End.

Apion violaceum Kirby. Yedmandale. An abnormal female, having the sutural striæ reaching almost to base of elytra, and united with the second striæ. The second and third striæ are interrupted about one-third from base by a wide interstice on the right elytron and partly interrupted and anastomosing on the left elytron.

Apion humile Germ. *Forma.* Bempton; Yedmandale. Small forms.

Otiorrhynchus picipes F. Langdale End. (Rev. R. A. Taylor). Abnormal through persistence of the mandibles.

Polydrusus micans F. var. *chlorophanus* Westh. Forge Valley. This variety has the upper surface clothed with grey-green scales. Kuhnt, l.c. 935.

Phyllobius urticæ De G., ab *piri* Herbst. Whisper Dale. Legs red-yellow. Kuhnt, l.c. 933.

P. calcaratus F. ab. *piri* F. Hackness. According to Kuhnt, l.c. 933, this form is distinguished by having the body clothed with scales, the elytra wider behind, with coppery, gold, or greenish scales, and with rather large bare patches. Legs red-yellow.

P. oblongus L. var. *floricola* Gyll. Yedmandale. This very distinct variety, according to Kuhnt l.c. is characterized by being unicolorous black with only the antennæ and legs yellowish.

Nanophyes lythri F. Langdale End. The type form, according to Kuhnt, l.c. 1021, has on each elytron a transverse lighter band in the front third and a smaller light spot, more densely covered with hair, before the apex.

Ditto, ab. *ruficollis* Rey. Langdale End. The following is the description given by Kuhnt l.c. of this form. Thorax entirely or in part yellow-red. Elytra at the base more or less dark with white oblique band, suture often red, margins of wing-cases often black.

Ditto, ab. *epilobii* Chevr. Kuhnt l.c. describes this as being entirely yellow-red or with only the head black.

Myelophilus piniperda L. Raincliffe Woods.

Tomicus laricis F. Forge Valley.

Apion virens Herbst. ab. *atratulum* Vit. Ringing Keld Bog. Kuhnt l.c. 1037. Upper side black.

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The Entomologist for February contains a list of the Neuroptera of Nottinghamshire, by Professor J. W. Carr.

There is an interesting report on 'Some Observations on a Tern Colony' (Blakeney Point, Norfolk), by William Rowan, in *Knowledge* for February.

The *Lancashire Naturalist* for January is a decided improvement, and includes a paper on "Some Alien Plants of the Mersey Province," by J. A. Wheldon, and 'Notes on the Terrestrial Isopoda (Woodlice) of Lancashire and some Adjacent Counties,' by R. Standen.

In *British Birds* for February Mr. J. Whitaker records a Baer's Pochard in Nottinghamshire, but on account of the species being occasionally placed in parks, etc., the editors opine—and, we think, correctly—that it is inadvisable to admit this species to the British list. We wonder what would have happened if it had been shot in Kent or Sussex.

ICHNEUMONIDÆ FROM YORKSHIRE AND LINCOLNSHIRE.

J. W. CARR, M.A., F.L.S.

In a large collection of insects of all orders obtained chiefly in Nottinghamshire, and recently submitted to me for identification, I found a number of Ichneumonidæ collected in the neighbouring counties of York and Lincoln. These have been determined by Mr. Claude Morley, F.Z.S., and as many of them appear to be new to the counties named, it seems desirable to place them on record.

YORKSHIRE SPECIES.

Ichneumon extensorius L.—♂♂, Wakefield, August 1913 (J. W. Saunt).
I. confusorius Gr.—♂♂. Ditto.
Chasmias motatorius Fab.—♂, ♀. Ditto.
Amblyteles palliatorius Gr.—♂♂. Ditto.
A. subsericans Gr.—♀. Ditto.
Pimpla arundinator Fab.—♀. Ditto.
P. detrita Holmgr.—♀. Ditto.
P. turionellæ L. ♂. Ditto.
P. alternans Gr. ♀. Ditto.
P. maculator Fab. ♂♂. Ditto.
Glypta bifoveolata Gr. ♂. Ditto.
Lampronota melancholica Grav. ♂. Ditto.
Banchus pictus Fab. ♀♀. Ditto.
Exetastes lævigator Vill. ♀, Wakefield, 1913 (W. Fletcher).
Mesoleius semicaligatus Gr. ♂, Wakefield, August 1913 (J. W. Saunt).
Campoplex pugillator Gr. ♂. Ditto.
C. oxyacanthæ Boie. ♂. Ditto.
Omorga faunus Gr. ♀. Ditto.
Agrypon flaveolatum Gr. ♂. Ditto.
Ophion scutellaris Thoms. Wakefield, 1913 (W. Fletcher).
O. stigmaticus Morl. ♂, ♀, ditto. Parasitic on *Agrotis agathina*.
Paniscus cristatus Thoms. ♂, Wakefield, August 1913 (J. W. Saunt).
P. melanurus Thoms. ♂, Wakefield, 1913 (W. Fletcher).
Echphoropsis viennensis Gr. ♀, ditto. Parasitic on *Agrotis agathina*.

LINCOLNSHIRE SPECIES.

Cratichneumon annulator Fab. ♂. Stapleford Wood, 13th July, 1913 (J. W. Saunt).
Ichneumon confusorius Gr. ♂. Ditto.
Cryptus obscurus Gr. ♂. Ditto.
Pimpla maculator Fab. ♀. Immingham, 14th September, 1913 (J. W. Saunt).
Glypta nigrina Desv. ♀. Stapleford Wood, 13th July, 1913 (J. W. Saunt).
Banchus pictus Fab. ♂. Skegness, 30th July, 1913 (F. M. Robinson).
Tryphon elongator Fab. ♂. Stapleford Wood, 13th July, 1913 (J. W. Saunt).
T. trochanteratus Holmgr. ♀. Ditto.
Euryproctus notatus Gr. ♀. Ditto.
Omorga faunus Gr. ♀. Ditto.

Naturalist,

A NEW MITE:
JOHNSTONIANA LÆVIPES N. SP.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

THIS mite differs from that described in *The Naturalist* for August, 1909, page 281. Its general anatomy is very similar, however, and the description thereof then given will in most respects serve for a description of *lævipes*. The legs of the

JOHNSTONIANA LÆVIPES n.sp. (*a*); Palpus (*b*).
Length of body, 1·25 mm. to end of snout, 0·40 extra.
,, first leg 2·69, second leg 1·40, third leg 1·60, fourth leg 2·15.

JOHNSTONIANA ERRANS. Legs, first and second (*c*).
Length of first leg, including epimera, 2·15 mm.
,, second leg, ,, ,, 1·57 mm

present species, however, are remarkably different; they are longer and more slender, hairy, but do not possess the remarkable mamillary elevations so characteristic of *R. errans* (see Fig. c, page 282, *The Naturalist*, August, 1909) which are so striking when seen under the microscope. I shall not be surprised if other species of *Johnstoniana* are hereafter recorded.

THE LOWER SEVERN PLAIN DURING THE GLACIAL PERIOD.*

It's a far cry from Yorkshire to the Lower Severn, but the Glacial geologist less than most naturalists can afford to limit his horizon within parochial bounds. He contemplates the effects of causes geographically as remote as Scandinavia, and in like manner looks from causes operating in the vale of York to effects produced in the Severn basin.

When the great Scandinavian ice-sheet invaded the shores of England, it profoundly disturbed and deranged the whole drainage—ice as well as water—of our eastward-sloping valleys. All the natural outlets to the east were closed, and waters that would, under ice-free conditions, have found an escape by the Humber, the Wash, or perhaps the River Lea in Essex, were impounded against the midland watershed to form lakes that found their lowest, and therefore their only, escape by gaps in the divide between the eastern and the western river systems. Thus it came about that the Severn received, besides the drainage of its own hydrographical basin, great volumes of water from the north, the west, and the east of England. Much of this water came from the country that stood above or beyond the reach of the glaciers, but a far greater part was melt-water from the ice-sheets and glaciers themselves. It may well be supposed that a good deal of rock-detritus was rafted over on ice-floes, and in other ways took advantage of a 'lift' from floating ice, and the gravels and 'diluvium' in general in the Severn basin possess a special interest to students of the Glacial Deposits from the evidence that they afford of this operation. We have long known that Red Chalk, a distinctive East Coast rock, is recorded from the Severn basin, as well as rocks from northern (Scottish and Cumbrian) sources, but a critical re-examination of the whole of the evidence has been long overdue. We are pleased to see that a veteran geologist, Mr. J. W. Gray, F.G.S., has undertaken the task, and in the paper cited sets himself to a careful recital of previous records with a large body of additional facts from his own observations and a modest amount of theory of his own. He, of course, rejects the Murchisonian 'Straits of Malvern,' and ascribes most of the drift deposits of the Lower course of the Severn to 'derivation from moraines left by ice-sheets that approached the district from the north and east.' 'Other parts may be remnants of Tertiary Gravels.' He detects no signs of advance of the ice in a southerly direction beyond Upton Warren and Salwarpe.

* J. W. Gray, F.G.S., 'Proc., Cotteswold Nat. F.C.', Vol. XVII., part 3, 1912, pp. 365-380.

Marine shells in a very fragmentary condition are found, but these would not call for more than moderate encroachment of the sea, and afford no evidence of a great Post-cretaceous submergence of the whole of the Plain. The list of shells recorded by Allies, Murchison, Lloyd, and Lucy is given without critical remarks, for it is obviously impossible to impugn the identifications of authors long dead, and equally to contradict their statements, at the same time the present writer claims the privilege of uttering a word of warning against a too trustful acceptance of some of them, especially 'Oliva' 'found in good preservation under twelve feet of gravel by Strickland and Allies.' If the shell was indeed found by those two gentlemen, and not acquired from the nomadic navvy who carries geological treasures from one job to another, and occasionally imposes upon the unwary, then we must find some explanation of the apparition of an exotic like Oliva in amongst a very typical assemblage of modern British shells. I throw out the suggestion that the shell might have been *Voluto-mitra Greenlandica*, a species recorded from the Manx Glacials, but the 'navvy' hypothesis is to me the more acceptable—anything, however, is less improbable than that a true Olive was a real constituent of the Post-Tertiary fauna of the Severn estuary.

A full list of mammalian remains is given. Would that some potent spiritualist medium would use the word of power, and call up Strickland, Maw, Lucy, and the rest of those painstaking observers who record 'Elephant, Rhinoceros,' and ask them to signify by appropriate raps upon the table whether their elephants had straight or curly tusks, and whether they would kindly state for the benefit of a sorely tantalized posterity whether their Rhinoceros commonly wore a woolly coat. The omission of this rather vital information is not chargeable to Mr. Gray, but to the authors whom he quotes, and we may hope that, as he proceeds with his self-imposed task of reviewing the whole field of the Superficial Geology of the Severn system, he will continue to record with the same completeness and imperturbability all the data, whether fully intelligible or not, just as he finds them.—P. F. K.

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The Board of Agriculture and Fisheries has recently issued Leaflet 281, dealing with the Apple Leaf-spot (*Sphoeropsis malorum*).

Mr. W. H. St. Quintin, J.P., has been elected President of the Yorkshire Philosophical Society in succession to the late Dr. Tempest Anderson.

We learn from the press that 'Ringed on the leg as a nestling in August last year, on Farne Island, a cormorant has been shot at Filey. It had been observed fishing very actively and destructively for two hours immediately before falling to the gun.' Moral: Don't fish at Filey.

FIELD NOTES.

FUNGI.

***Humaria Chateri* (W.G.S.) Sacc., in Holderness.**—Some very fine specimens of this beautiful and distinct species were seen by Mr. T. Stainforth at Kelsey Hill on the 12th and forwarded to Halifax. One specimen measured over 2 cm. (more than twice its usual size) across. The sender remarked :—'There are more than a hundred square yards of it growing on practically bare gravel.' Its favourite habitats are damp paths, road scrapings, etc. (*See* Mass., Brit. Fung. Flo., IV., pp. 404-5.)—C. Crossland.

Fungi found after Severe Frost.—After frost fungi are as a rule very scarce. Some of the polypores live for several years, and *Xylaria hypoxylon* seem to survive freezing. On 6th and 7th December, 1913, there was a hard frost, and all specimens were frozen, but on 11th December the following were found in good condition in a mixed wood at Robin Hood's Bay :—*Clitocybe fragrans, Psathyrella atomata, Hypoloma fasciculare, Tubaria furfuracea.* On 12th December, in fir wood, Robin Hood's Bay :—*Nolanea pisciodora*, very strongly smelling, *Hygrophorus hypothejus, Clitocybe cyathiformis, Tricholoma terreum, Collybia tenacella* were found. On the same date, however, very few specimens were to be seen in the pasture fields ; *Stropharia semiglobata* and *Panæolus campanulatus* were the only ones found. On 20th December, Cloughton Wood, which contained fifty species on 15th November, at this date had very few in good condition. *Russula cyanoxantha, Clitocybe brumalis, Russula emetica, Tubaria furfuracea* were found. Near Nuneaton the following were found during severe frost on 4th January, 1914 :—*Collybia velutipes, Stereum hirsutum, Stereum purpureum.* On 11th January some of the specimens were quite hard when brought in, and yet spored freely when thawed. Such were :—*Tubaria furfuracea, Psathyrella atomata, Collybia velutipes, Stropharia semiglobata.* From the above lists it will be seen that some of the agarics here named are very tenacious of life, for instance, *Tubaria furfuracea, Stropharia semiglobata, Collybia velutipes.*—(Miss) C. A. Cooper, Robin Hood's Bay.

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BIRDS.

Ringed Starling at Scarborough.—I had brought to me to-day, a female Starling, belonging to the purple-headed race, which had been picked up near the town, having sustained some injury which had caused its death. Upon its leg is a small white-metal ring, bearing the inscription, 'Vogelwarte, Rossitten, 7043.' I have preserved the skin with the ring 'in situ.'—W. J. Clarke, Scarborough, Jan. 1st, 1914.

Water Rail at Bridlington.—A Water Rail in excellent plumage was picked up on the golf course at Bridlington on the 1st of February, evidently having been damaged by coming into contact with telegraph wires.—T. S.

Waxwings in East Yorkshire.—There has been a widespread immigration of Waxwings this winter. Nine birds have been brought in to our local taxidermist, Mr. J. Darley, as follows:—18th November, 1913, one from Thearne; 21st November, one from three miles off Thearne; 8th December, one from Hutton Cranswick; 10th December, one from Hornsea, killed by a cat in the garden of Mr. J. J. Grainger, which a pair had frequented for about a month previously; 20th December, one from Driffield; 22nd December, one from North Cave, out of a flock of eight; 23rd December, two from near Selby, where the sender reported that he had seen a flock of about forty; 30th December, one from Barrow-on-Humber; and during the second and third week of January, 1914, one bird frequented a garden at Elloughton; two observed at Ferriby at the end of January.—E. W. Wade.

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The **Transactions of the Nottingham Naturalists' Society** have just reached us, and contain the Rev. Hilderic Friend's third paper on Annelid Hunting in Notts.'

The Annual Report of the Yorkshire Naturalists' Union (reprinted from *The Naturalist*), containing the reports of the work of the various sections and committees during 1913, has been published. (A. Brown and Sons, 1s.).

From the **Annual Report of the Midland Natural History Society** it is apparent that this Society is continuing its good work. There is a brief summary of the papers read, together with an account of the rambles, and sectional reports. The Secretary is Mr. R. Watkin, Engineer's Office, Midland Railway, Derby.

Messrs. Witherby have published a Guide to Selborne and a Synopsis of the life of Gilbert White, by W. H. Mullen, as **Bulletin CXC. of the British Ornithologists' Club.** We do not know of anyone better qualified than Mr. Mullen, but 2s. 6d. net for a little paper-covered pamphlet of thirty-seven pages seems rather a 'stiff' price to pay.

The Proceedings of the University of Durham Philosophical Society contain a well illustrated paper on 'The Great Whinsill of Kirkwhelpington,' by Mr. G. Weyman; 'The Structure of Metals,' Sir J. Alfred Ewing; 'Deforestation in Ancient Greece,' by M. S. Thompson; 'Colour Changes in Colloidal Gold,' by S. H. Long, etc. The publication is sold by Andrew Reid and Co., Newcastle, for half-a-crown.

Part 3 of Volume LVII. of the **Manchester Literary and Philosophical Society Memoirs and Proceedings** is a substantial volume, and includes the following papers of interest to our readers:—'The Variation of *Planorbis multiformis*,' by G. Hickling; 'Relations between *Puccinia malvacearum* and the Tissues of its Host Plant (*Althæa rosea*)' by Wilfrid Robinson; 'Root-Apex and Young Root of *Lyginodendron*' and 'A Tylodendren-like Fossil,' by Professor F. E. Weiss, and 'Contributions to the History of Science based on Autograph Documents,' by K. Loewenfeld.

CORRESPONDENCE.

ECOLOGICAL METHODS OF SOIL ANALYSIS.

With regard to the recent discussion on this subject (see *The Naturalist*, 1913, pp. 169, 239, 436), there is perhaps something to be said, on grounds of linguistic accuracy, for insisting that the 'content' of the soil in any constituent, when expressed as a percentage, should be related to the sum-total of all the constituents taken as 100, rather than to any other standard. But it is certainly true that in the case of water, which stands in quite a special position as a soil constituent, many investigators have expressed the content as a percentage of 'air-dry' soil or of soil dried at 100° C., and provided the fact is stated, no one is misled. Similarly with regard to 'water absorbed.' If we start with, we will say, 'air-dry' soil, and make it absorb water till it is saturated, it is perhaps most natural to relate the amount of water absorbed to the weight of the air-dry soil, because that is what one started with, just as in the case of analysing a moist soil, it is the whole weight of this with which one starts. Thus we have a technical difference established between 'water absorbed' by a dry soil (related to the dry soil) and 'water content' of a wet soil (related to the wet soil).* Mr. Crump, however, was not dealing with water absorption experiments but with *water contents of natural soils*, and if he finds it more illuminating to relate the said water contents to the dry rather than to the wet soils, surely it is just a trifle pedantic to lay all the stress on the technical point, where, if Mr. Crump errs, he errs in very good company, while ignoring without a word of comment the advantages Mr. Crump claims for his procedure.

With regard to taking the water-content as loss on air-drying rather than as loss at 100° C., there is difference of opinion as to which method is preferable, and there is at least something to be said on both sides. Into this question it is not my purpose to enter. Again, Mr. Johnson is right that there cannot in the strict sense be two water contents of the same soil, but if exactly what is meant is made clear there can be no quarrel on the ground of 'confusion'; at the most exception may be taken to the particular use of terms.

Mr. Johnson is very anxious about 'adding another to the already too long list of standards.' Has he not realized that scientific progress largely consists in readjusting our standards as we discover new relations between phenomena? Mr. Crump's $\frac{\text{water}}{\text{humus}}$ ratio, or 'soil-moisture coefficient' is precisely an attempt in this direction, and it promises, I think, to be a very valuable attempt. The fact that Mr. Crump has actually obtained strikingly concordant results* where hitherto we have groped among strikingly discordant ones is in itself sufficient proof of the value of his new method.

In dealing with Mr. Crump's $\frac{\text{humus}}{\text{mineral}}$ ratio, Mr. Johnson says that this ratio, 'the "convenient method" given for estimating the humus content' is 'obviously incorrect,' and goes on to allude to 'this equation.' Mr. Crump gives no such equation and alludes to no such equation. The *ratio* in question is stated by Mr. Crump to be a 'convenient way of expressing the humus content of the peat.' Mr. Johnson substitutes for 'expressing' the word 'estimating' in one place and 'obtaining' in another, and 'gives' in a third. He has no difficulty in showing that you cannot 'obtain' a quantity by means of a ratio one of the terms of which is the quantity itself, or in other words, that $\frac{\text{humus}}{\text{mineral}}$ humus is an absurd equation. But Mr. Crump's word was 'express,' which has a distinctly different meaning. The ratio in question gives, of course,

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Naturalist, June 1913, p. 241.

† See the original abstract now reprinted in the *Journal of Ecology*, Vol. I., p. 96, and especially *New Phytologist*, Vol. XII., 1913, pp. 125-147.

a number—a coefficient, analogous to the 'soil-moisture coefficient' given by the ratio $\frac{\text{water}}{\text{humus}}$, and it certainly does 'express' though it in no sense 'gives,' the humus content of a soil. What its value as an 'expression' of humus content may be we need not discuss, since Mr. Crump has already said that he does not regard it as 'a matter of any importance,' and has explained why he found it convenient.*

Mr. Johnson asserts (page 436) that 'the defence of this equation involves the accuracy of the whole paper. . . . We now find that the cardinal point of the whole paper—humus-content—rests on uncertain ground.' This is an erroneous assertion. There is no question of defending an equation which has never been put forward, and if there were it would not 'involve the accuracy of the whole paper,' because it has nothing to do with the main subject of the paper (abstract). The $\frac{\text{humus}}{\text{mineral}}$ ratio is mentioned only in a final line as quite a separate thing, and the water ratio does not depend upon it in any way whatever.

In defending his own simple, and (as Mr. Crump admits) literally true statement that 'peat usually contains 80 to 90 per cent. of moisture, and when air-dried 15 to 25 per cent.,' Mr. Johnson refuses 'to enter into a discussion of the accuracy of such a well-known and generally accepted scientific fact.' No one has impugned its accuracy. Mr. Crump expressly says the statement is literally true. On the other hand, to say that 'the suggested changed standard of comparison is purely imaginary' is to deny flatly the obvious fact that in one case the standard is wet peat, and in the other case air-dry peat. Both quantities (of water) are percentages, but they are percentages of different totals. What is that but a changed standard of comparison?

Those interested in the subject will find a full account of Mr. Crump's method, and of the striking results that can be obtained by it, in 'The Coefficient of Humidity: a New Method of Expressing the Soil-moisture' (*New Phytologist*, Vol. XII., 1913, pp. 125-147).

Botany School, Cambridge. A. G. Tansley.

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The Bodley Head Natural History. By **E. D. Cuming**, with illustrations by **J. A. Shepherd. Vol. 2. British Birds. Passeres.** London: John Lane, 1914, 122 pp., 2s. net. This volume has all the charms and attributes of its predecessor, recently noticed in these columns. It deals with Whitethroats, Warblers, Wrens, Hedge Assentors, etc. The scores of illustrations and general 'get up,' are all that can be desired.

A History of Threekingham-with-Stow, in Lincolnshire, attempted by **W. A. Cragg.** Sleaford: W. K. Morton & Sons. 155 pp., price 6s. net. Like every other place, Threekingham has a history, and in this book the author has modestly 'attempted' to record that history, so far as he has been able to read it. It is divided into sections under the headings of our various reigning monarchs, under each of which Mr. Cragg has recorded everything he has been able to find. Naturally they vary a good deal; for instance, under James II. we find half-a-dozen lines only, record ing that one Edmund Hutchinson gave a sundial, now on the church porch, etc., whereas under 'William and Mary,' there are several pages. There is the usual story of the horrors of 'restoration' of the church. There is an interesting botanical note, *circa* 1793, and a long list of plants on 'a bank by the roadside about 100 yards long, whereon grows the greatest variety of herbaceous plants that I have ever met with in so small a compass before.' There is a very unusual chapter on 'Lincolnshire weather in A.D. 1330 and A.D. 1790 contrasted'; there being in existence two journals of the weather for these periods. Mr. Cragg has done a distinct service in preserving the various records in his history.

* *Naturalist*, June 1913, p. 241.

REVIEWS AND BOOK NOTICES.

Stone Cutting and Polishing, by G. Day. London : Routledge. 51 pp., sixpence. This is a handy guide-book to those interested in stone-cutting and polishing, and there is evidence that there is a constantly increasing number of these, especially in Yorkshire where the beach provides so many agates and other suitable stones for the purpose. Mr. Day's book is well illustrated, but the white carnelian and moss agate shown in the frontispiece would just as well illustrate table tops. The pamphlet is apparently a reprint of that issued by Messrs. Dawbarn & Ward, in their 'Useful Art Series,' some years ago.

American Permian Vertebrates. By **S. W. Williston.** University of Chicago Press. Illustrated, pp. 1-145; 38 plates, 10s. net. This is a collection of monographic studies, with descriptions of new and rare reptiles and amphibians from the Permians of Texas and New Mexico. Our American friends are more fortunate than English geologists, inasmuch as they possess numerous remains of the actual skeletons of the Permian vertebrates, and judging from the plates (especially that of *Varanosaurus brevirostris*, which might almost be mistaken for the skeleton of a modern salamander), these are frequently in a remarkable state of completeness. Professor Williston's book is an important contribution to a subject on which English geologists cannot compete, but they will nevertheless welcome it.

Animal Geography, by **Marion I. Newbegin.** Oxford : 238 pp., 4s. 6d. Dr. Newbegin has written a thoughtful book, on new lines. She has attempted to study the relation of the world's fauna to its various environments after the manner in which botanists have recently so thoroughly brought forward botanical geography. And she has a very pleasant style which makes a careful perusal of the book imperative. The chapters include the Tundra and its fauna; the Taiga, or Coniferous forest and its fauna, Steppe Faunas, Mountain Faunas, the Fauna of the Tropical Forest, Tropical Savanas and Deserts, Special Features of Island Faunas, The Distribution of Animal Life in the Sea, Animals of Lakes and Rivers, Cave Faunas and Zoogeographical Regions. An 'Outline Classification of Animals' is given as an appendix. There are several illustrations, many being from specimens in the Edinburgh Museum.

East Yorkshire. A Historical Guide for* young and old. By **A. N. Cooper.** Scarborough : E. T. W. Dennis & Sons, 91 pp. 1s. 4d. net. Still another book on East Yorkshire! The present author informs us he has learnt to tell his experiences as simply and truthfully as he can, and certainly no one will be able to misunderstand his account of the Romans at Filey, the Saxons at Driffield, the Danes at Flamborough, the Beverley Trade Gild, Archbishop Lamplugh, the Abolition of Slavery, or the other twenty chapters on similar topics, and they are very 'readable.' On the origin of some of the place-names and personal names there is room for difference (as Lamplugh, because his ancesters ploughed by lamp-light!), and in some other small ways, but they detract but little from the interest of the volume. But it is certainly worthy of being better printed. Mis-prints abound (kindgom, cheifly, incnr, writling, etc.); whereas letters from wrong founts (particularly o's, of which there are many varieties), letters upside down, wrong stops, etc., occur in many instances several times in a single paragraph. Mr. Cooper evidently believes in handwriting being an index of character, and he says, 'If your hand-*writlng* (sic) is slovenly, what is the inference?' Being ourselves not the plainest of penmen, we will only ask, 'If your proof-reading is slovenly, what is the inference?' By the way, he refers to the British (not Viking) boat at Brigg, Lincs. If he consults the Transactions of the East Riding Antiquarian Society, she will find it is at Hull.

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* 'To young and old,' on the first page.

The Beasts, Birds, and Bees of Virgil. A Naturalist's Handbook to the Georgics. By **T. F. Royds, M.A., B.D.** Oxford: B. H. Blackwell, 1914, pp. 107, 3s. 6d. net. This book is all it professes to be by its title, and is charmingly written and scholarly withal. Twentieth century naturalists will do well to peruse it and profit thereby. There is a preface by Mr. W. Warde Fowler.

The Further Evolution of Man. By **W. H. Calvert.** London: A. C. Fifield, pp. 324, 5s. net. The author attributes the origin of his book to the help given by associating with the fine intellectual vigour and acumen of the minds of the Shakespeare Club of Montrose, without which it would never have appeared. He especially thanks the Secretary, a Clergyman, for his views on good and evil, punishment and imprisonment. He will have none of the Doctrine of Malthus and Darwin (who are bracketed throughout) and with the aid of innumerable quotations (more or less appropriate) from Shakespeare, *The Scotsmon*, and the Bible, he believes that 'Darwinism, Malthusianism and natural selection—so long the accepted creeds of science—have been weighed in the balances and found wanting.' His arguments—or shall we say his opinions, extend to over 300 closely printed pages, to which we must refer any of our readers who may be interested.

History of Conisborough. From the Earliest Ages, by **C. H. Allport.** Sheffield: Independent Press, Ltd., 96 pp., 6d. From the front cover of this History we learn that 'There was not in all the world a burg so fair,' and from the back the 'Best brewed beers in Britain,' are from Sheffield. Possibly both are exaggerated. Though the pamphlet contains less than a hundred pages, only half of that relates to the 'History,' the other half being occupied by advertisements for funerals and weddings, rabbits, stout, beef, bricks, soap, tea, bottles, whisky, boots, etc., which we are sorry to say, cannot be torn out, as they are printed on the back of the letterpress. A little while ago we had the misfortune to have to listen to a lecture on Prehistoric Man. The lecturer dealt with the nebular hypothesis, etc., and the geological history of the earth from the earliest times, and after nearly two hours' talk the gas in the lantern fortunately gave out, and 'prehistoric man' did not arrive. Similarly, in his anxiety for thoroughness, we fear that Mr. Allport has not told us quite as much about Conisborough as we should have liked; but, like the man at the piano, we must not shoot him as he is doing his best. We commence with Pooh Bah in the Opera, and The Beginning of All-port—we mean all things. Next, we have the pedigree of Brutus, the 'Discoverer of Britain,' direct from Noah, and it is interesting to notice that only after quite a long array of names do we find that one was 'married.' Next we have 'another version'—the 'genealogy of Brutus'—'Romulus and Remus,' and 'Saturn' ('King of the Greeks') to the founders of Rome. It is not stated whether any of these were married or not! We then come to 'The Brito-Roman Period,' when 'David was singing his psalms in Jerusalem to the accompaniment of the harp, flute, dulcimer, etc,' when King Ebraucus 'apparently anxious to find occupation for his family (20 sons and 30 daughters!) decided to build two cities. One of these was York and the other apparently was well, we are not quite sure, but we believe it is thought to be Conisborough. Next we have a pedigree from '——?'—(a very doubtful starter) and Arthur, apparently son of Uther Pendragon. Then an advertisement for Celebrated Beers and Stout, followed by Chapter IV. 'Early Struggles,' and so on. But after a while we really reach Conisborough, when a species of Guy Fawkes, dressed in straw, is labelled 'The Village Pump,' and a block obviously upside down is labelled, 'carving of pillars.' A little later we learn (p. 73) 'the probability is that the man had been drinking, and 'saw snakes'? Anyway, the pamphlet is worth the 'saxpence.'

NORTHERN NEWS.

Mr. J. Buckland sends us a copy of his paper on *The Plumage Bill the Duty of the Hour*, in which he makes a strenuous protest against the extermination of rare birds for the sake of their feathers.

The *Transactions of the North of England Institute of Mining and Mechanical Engineers*, Vol. XLIV., Part 1, contains a paper on the lead mines and works of the Vieille Montagne Zinc Company at Nenthead, on Alston Moor, Cumberland.

Sir Herbert Maxwell writes to *The Times* to the effect that as a fisherman of over fifty years' experience of the habits of salmon in many rivers, and as an observant naturalist, he has failed to detect the slightest preference on the part of salmon for one pattern of 'fly' over another.

Part 3 of the *Transactions of the Entomological Society of London* contains a number of interesting papers, including 'The Urticating Properties of *Porthesia similis*,' by H. Eltringham, and 'Illustrations of Specific Differences in the Saws of ♀ *Dolerids*,' by the Rev. F. D. Morice.

The *Annual Report of the Libraries, Art Gallery, and Museums of Bradford* contains a lengthy list of additions to the museum, including a somewhat unexpected item :—'Sixty-six species of dried trees and shrubs grown in Great Britain.' We presume there will soon be necessity to enlarge the Cartwright Hall.

We learn from the *Whitby Gazette* that the prevailing epidemic has reached the Whitby Museum, and that 'it has been regarded and rightly and proudly so as one of the best little museums in the British Isles.' It also possesses "one of the finest zoological collections in any similar institution." The point of the article seems to be that the latter has been sadly neglected.

We have received *A Short Guide to the Meynell Museum*, Denstone College, by Messrs. A. A. Armstrong and A. C. A. Brett, which is sold at threepence. It contains an interesting history of the collections, and long ago a catalogue of thirty-four printed pages was published, which at that time was such a serious financial drain that a proposal was brought forward to sell the contents of the museum in order to defray the printing of the catalogue!

The *Report of the Corresponding Societies Committee* and of the Conference of Delegates held in Birmingham, at the British Association Meeting, can be obtained at Burlington House for one shilling. It contains Dr. P. Chalmers Mitchell's address on 'Utility and Selection'; a discussion in reference to plant extermination; together with a useful bibliography of the contents of the various affiliated societies' publications, classified under subjects.

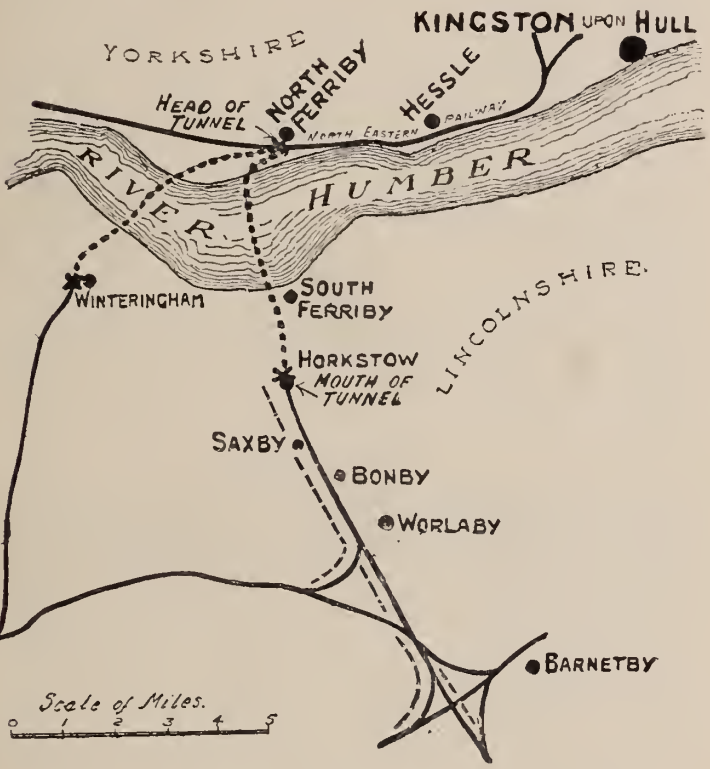
The large collection of geological, zoological, and botanical specimens formed by the late Dr. Franklin Parsons, have been offered to the Croydon Museum, and we notice that the proposal of the Roads Committee, (which has the care of the park in which the Grange Wood Museum is situated), that the gift be declined, was referred back so that the collection might be examined by experts before a final decision is arrived at. It is also suggested that the Museum should be transferred to the Libraries Committee, with a grant.

The Rochdale Museum is emulating other similar institutions in publishing a series of handbooks, in this case reprinted from the Transactions of the Rochdale Literary and Scientific Society. We have before us Publications Nos. 2, 3, and 4, the first-named being twopence and the others one penny each. No. 2 is an account of the Flora of the Rochdale District, and is a careful compilation by Mr. F. Williamson, the Curator. No. 3 is an account of the Birds of the Rochdale District by Messrs. Williamson and W. Lord; while No. 4 is entitled 'Querns and other Corn-grinding Stones in the Rochdale District,' and is by Mr. J. L. Maxim.

NOTES AND COMMENTS.

THE HUMBER TUNNEL.

At a recent meeting of Engineering students at the Leeds University, Professor P. F. Kendall dealt with the subject of tunnel construction under the Humber. He said this scheme would probably be completed before the Channel tunnel. He conceived it to be a vital necessity for Hull.



The dotted lines crossing the river represent Professor Kendall's alternative schemes for tunnelling the Humber. Both from a geological standpoint and for railway facilities the route from South Ferriby to North Ferriby is the better one. The tunnel is necessary if Hull is to serve the new Doncaster coalfields. The network near Barnetby indicates by full lines the existing railways—the Great Central, the Trent, Ancholme and Grimsby line, and the Market Rasen branch—and it would be necessary to link up Horkstow with Barnetby Junction. New lines are indicated by broken lines.

The exploitation of the Yorkshire coalfield eastward had shifted the industrial focus completely, and if Hull was to maintain its position as a port it must get hold of the great traffic from the southern part of Yorkshire around Doncaster. These new pits were equipped to raise immense quantities of coal, and great traffic was, therefore, arising south of the

Humber. If Hull missed it, she would also lose the trade which the coal vessels brought back, and in that way she would gradually be side-tracked. Generally speaking, the schemes so far propounded divided themselves between an easterly and a westerly route. By the easterly route it was proposed to cut a tunnel placing Hull into quicker reach of Grimsby, as to which he would only say that if Hull accepted this she would deserve to fail, because it would only mean the diversion of traffic to Grimsby—a port much nearer the sea. Besides, it took little account of geological conditions. He showed a plan illustrating the effect of glacial deposits upon the coast of Holderness, by which it appeared that in pre-glacial times the mouth of the Humber was close to Hull, was trumpet-shaped, and pointed due east. Now the river debouches to the south-east. An engineer constructing a tunnel at this point, therefore, would strike into boulder clay and gravel, which was very treacherous and difficult to work. He would, in fact, meet with the same fate as the first projectors of the first tunnel at Liverpool for the Vyrnwy Waterworks. Personally, he was in favour of a tunnel on the west side of Hull, because it would avoid the boulder clay and would serve Hull better. No easier ground for the purpose could be found in the kingdom.

MACADAM ROADS.

Professor Fearnsides had a paper 'On the part played by water in Macadam road construction,' in *The Quarry*, for February and March. He concludes that (1) The chemical action of water upon materials in roads is small as compared with the rate of mechanical wear; but care should be exercised in choosing materials which are to be buried in road foundations. Furnace slag for this purpose is not above suspicion. (2) The power of water to bind is an effect of surface tension, and for maximum strength and efficiency it is important that the proportion of water should be kept at the optimum; 'as dry as it can be drained' is the first approximation to the optimum for most water-bound road materials. Potholes grow by wear of traffic at those places where by local water-pockets the proportion of water is kept above the optimum.

AND WATER.

(3) Certain site-rocks, the argillaceous or clay rocks, owe their strength to waterbinding, and are subject to the same conditions of optimum water-content. The importance of cambering and draining the site is therefore equal to that of arranging the configuration of the road surface. (4) The effects of dew, more especially the dew which distils from

below, are noteworthy, and in this, as in the question of the strength of the road, the importance of complete sub-crust drainage is to be emphasized. (5) Water among solids which it does not wet acts as an insulator, and in the making of tar, pitch, asphalt, or bitumen, macadam should be rigorously eliminated before stones and binder are brought together. The feasibility of chemical drying by adding to the partially-dried stones a suitable proportion of quicklime or unslaked cement is suggested. Summarily it is concluded that for each and every road aggregate there is a characteristic optimum proportion of water, which for efficient service of road user, the road-maker cannot afford to disregard.

'CLEAT' IN COAL SEAMS.

In the *Geological Magazine* for February, Professor Kendall has a valuable contribution on the question of the extraordinary persistence of the direction of the 'cleat' in coal seams, which direction seems to be entirely independent of the joints in the beds either above or below. It seems remarkable that the importance of this feature appears to have been so much neglected by geologists. Professor Kendall suggests the following working hypothesis with regard to it. 'When our Coal-measures were first laid down they would consist of a series of incoherent sands and muds, and this uncompacted condition may have persisted for a very long period, so long as pressures were not excessive and no cementation took place; even surviving considerable tectonic disturbances, if we may judge by the condition of the Bovey Tracey Beds. The peats, however, would be subject to changes dependent upon processes entirely innate; the gradual loss of volatile constituents or at least the resolution of the carbon compounds into new groupings and the conversion of the mother-substance of the coal into lignite. This has happened, as Principal Clayden informs me, to the logs and trunks in the Bovey Tracey deposits, and I have observed the same thing in the coaly lenticles at Alum Bay. Professor J. J. Stevenson, in the latest of his brilliant and closely reasoned memoirs on the formation of coal-beds, cites two instances of Quaternary peats passing into lignite. In this condition the coal substance would be brittle and liable to joint. Now, let a deforming stress or strain be applied, or perhaps a wave or tremor sweep the country, and the sheet of brittle material would be shattered, while the unconsolidated sands and clays would, of course, be unaffected.'

ICE-FLOWS IN THE TRENT BASIN.

In the same journal Mr. R. M. Deeley points out that with regard to the drift deposits of the Trent Basin, 'their

most marked peculiarity is that they consist of two distinct kinds of boulder-clay and gravel, the upper series being derived from the east and the lower from the west and north-west. This great disparity in the nature of their rock contents induced me, in 1896, to regard them as belonging to two distinct epochs of glaciation. I am now, however, of the opinion that they all belong to one great period of ice advance and retreat, which was probably marked by considerable but minor oscillations of the ice-front; for although the area might appear to be anything but a marginal region of the ice-flow, it really occupies such a position.'

SCANDINAVIAN AND BRITISH ICE.

He concludes that 'Britain, being near the edge of the continental shelf, would respond more readily to temperature changes than the Scandinavian ice-sheet to the north-east. It may therefore have happened that the British ice was on the wane long before the Scandinavian ice reached its greatest extension. Temporary changes of temperature would also tend to affect the margins of the ice-sheet rather than the centre of the area of dispersion. It thus seems to have come about that the maximum extension of different portions of the ice-margin occurred at different times, and that temporary slight ameliorations of climate affected the margins of the ice-sheet supplied by the British mountains more than they did the marginal portions fed by the Scandinavian ice. If this reading of what took place be correct, we must not regard a map showing the ground which had been covered by the ice-sheet at maximum extension as indicating the actual extent of the ground covered by ice at any one time, for it would appear that when the North Sea ice reached the neighbourhood of London the glaciers from the British mountains were already on the wane.' It will be observed that this is the opposite of Mr. Lamplugh's view: he considered that the waxing of the British ice caused the North Sea ice to wane.

A PALÆOLITHIC SKETCH.

At a meeting of the London Geological Society on 7th March Dr. A. Smith-Woodward exhibited and described a fragment of bone bearing an incised drawing of the fore-part of a horse, in the style of drawings already well known from several habitations of Palæolithic Man. The specimen was found by schoolboys in an old mound of debris from a quarry in the Inferior Oolite near Sherborne, Dorset. Nothing is known of the circumstances under which it originally occurred; but the situation of the quarry is in a small dry valley, on a steep slope facing south-westwards, and the bone may perhaps have been removed with the remains of a rock-shelter. No

associated specimens of any interest were recovered; but at the lower end of the same valley, about a quarter of a mile distant, teeth of mammoth and woolly rhinoceros have been found. Like the only other British specimen hitherto discovered—that described by Professor Boyd Dawkins from the Creswell caves—the drawing is made on a fragment of rib, and the neck of the horse is fringed by fine lines, which indicate the short hog-mane usual in sketches made by the Palæolithic race.

CONFERENCE OF BRITISH GLACIALISTS.

At a meeting of the Yorkshire Geological Society held at Leeds on March 19th, a letter was read from the President (Mr. R. H. Tiddeman) suggesting that during the coming autumn—probably in October—there should be a Conference of British Glacialists in order that the present position of glacial geology might be thoroughly reviewed from every point of view. The suggestion was unanimously agreed to, and the Conference will be held at Leeds and will last a week. In addition to papers and discussions, there will be excursions to the principal glacial centres of the North of England. Glacialists from all parts of the country will be invited to take part. A Committee was formed to carry out the arrangements, and consisted of Mr. R. H. Tiddeman, Professor P. F. Kendall, Mr. J. W. Stather, Mr. T. Sheppard, Mr. A. Gilligan and Mr. A. Wilson.

GEOGRAPHICAL DISTRIBUTION.

At the request of the President of the Second Entomological Congress, held at Oxford, Mr. John W. Taylor delivered an Address upon "Geographical Distribution and Dominance in Relation to Evolution and Phylogeny,' a reprint of which lies before us. This Address covers practically the same ground as his Presidential Address to the Yorkshire Naturalists' Union in the same year, but the argumentation was more pointedly directed for the enlistment of entomological research in working out the same problems. So far the state of knowledge of insect phylogeny is by no means commensurate with that we possess as regards the terrestrial mollusca and the human race, and also of the Oligochæt worms, and therefore the striking correspondence between the evolution of the various groups and their range in space—possibly also in time—which is seen in these groups, has still to be worked out as regards insects. Mr. Taylor states that distribution is regulated by law, and is intimately associated with phylogenetic evolution, the well-known facts of history and the known presence of the lowest types of human life in the regions most remote from the probable centre of the greatest

evolutionary activity correspond very closely with the results of the recent close investigation of the land mollusca, confirm the hypothesis that the Central European region is the true centre from which has emanated in successive waves all the higher types in every group. Geological evidence is of course very scanty and fragmentary, and it is so far a matter of difficulty to make out in detail how far the range in time illustrates that in space. The paper is illustrated by maps.

A CUMBERLAND NATURE RESERVE.

A Cumberland Nature Reserve Association has been recently formed with the Right Hon. J. W. Lowther as President, the Mayor of Carlisle as Chairman, and Mr. L. E. Hope as Honorary Secretary. The objects of the Association are twofold, namely, the promotion of Nature Reserves in Cumberland, and the institution of a Watcher's Fund for providing protection to plant and animal life in the county, particularly to those of the rarer birds requiring special protection during nesting. Already one Nature Reserve has been established on Kingmoor Common and adjacent wood, near Carlisle, where nesting-boxes have been fixed and drinking-ponds prepared. An appeal has been made to all interested in the preservation of our native fauna, some of which—like the Peregrine Falcon, Buzzard, and Raven—are the special objects of the egg-collector's greed, and it is hoped sufficient funds will be raised for this purpose.

MARSH GAS AT BRADFORD.

A little more than a year ago considerable interest was excited in Bradford by the announcement that in boring a well for a brewery in the city natural gas in considerable quantities had been met with. Interest in the discovery has been revived in the last two months by a series of explosions, which have done a good deal of damage and occasioned much alarm. The borehole was sunk in the premises of the Northbrook Brewery, Manningham, under the supervision of Professor Kendall, and shortly after a seam of coal of fair thickness had been penetrated, gas appeared. It was proposed at first that commercial use might be made of it, but the volume was found to be insufficient, and it has been allowed to discharge into the atmosphere. During December and January complaints were made to the Bradford Gas Office that the gas mains were leaking, but weak places could not be detected. On the night of 28th January an explosion occurred in a house within two hundred yards of the brewery, and shortly afterwards similar explosions occurred in several houses in different streets in the locality, in one case damage

to the extent of £200 being wrought. Professor Kendall next day examined the district, and found the ground 'saturated with marsh gas," and he advised the residents to keep their houses, and especially their cellars, exceedingly well ventilated. He predicted that gas might be expected to appear at any sudden drop in the barometer. That expectation has been justified, for on several such occasions gas has made its appearance in no fewer than ten houses, and has been lighted without explosion in cracks in cellar floors and other places. For days it was allowed to flare away at the top of a hollow gas standard in the street. Thanks to the warning as to ventilation no damage has since been done in the houses, but it is noticed, as at least an interesting coincidence, that one of the main buildings in the brewery in which the borehole is situated caught fire a few weeks ago and was burned down.

A GEOLOGICAL STUDY.

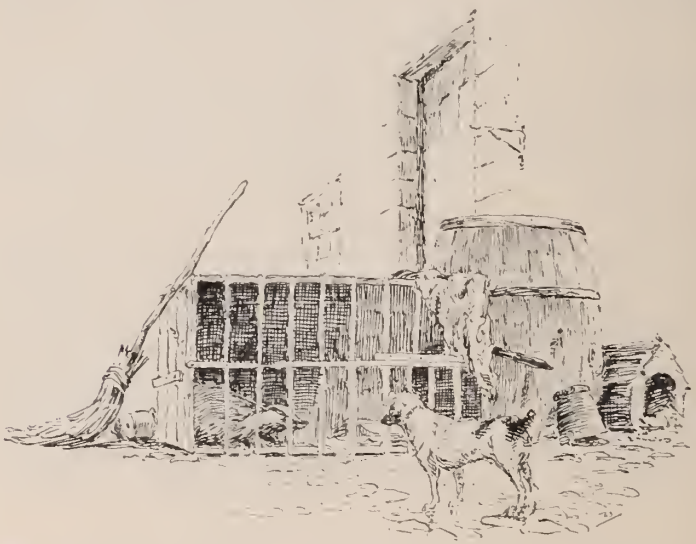
The gas has been analysed and found to be nearly pure marsh gas, doubtless derived from a coal-seam. The district is studded by old quarries in the coal-measure sandstones, and some of the houses affected are along a defined line on the map, suggesting the possibility that there may be beneath them a master-joint of the rock, and that this may have served as a distributive of the gas. Geology in that quarter of Bradford is for the present a very interesting study. We are indebted to the full reports in the *Yorkshire Observer* for much of this information.

THE YORKSHIRE SUMMER SCHOOL OF GEOGRAPHY.

The University of Leeds held a very successful course for teachers of Geography at the County School, Whitby last August ; and though the duty should have devolved upon either Sheffield or Newcastle this year, Leeds has agreed, in view of the impossibility of either of the sister Universities taking its turn, to undertake the task a second time. The course will be under the general direction of Professor P. F. Kendall, and the scheme of lectures will be different from last year's. The practical work will include a good deal of Meteorology, and more time will be devoted to field excursions that proved to be so valuable a feature last year. The idea underlying the syllabus is to give instruction and guidance to teachers in those aspects of the subject that are not satisfactorily presented in text books, and particularly those that the experience of examiners shows to be inadequately taught in schools. We have heard nothing but praise from many who took part in the work of this attractive course last year, and have no doubt that this year's result will be similarly successful.

REVIEWS AND BOOK NOTICES.

The Life and Habits of the Badger, by **J. F. Blakeborough** and **Sir A. E. Pease, Bart.** London: 'The Foxhound' Office, 101 Piccadilly. Price 5s. net., 112 pp., 4to. This is a chatty description of the badger from many points of view, and is illustrated by sketches and photographs, and also by photographs of the authors, which, however, must not be mistaken for wild animals. The chapters include: 'The Habits of the Badger,' 'A Badger Dig,' 'Badgers and the Mange,' 'The Badger in Folklore and Early Literature,' 'The Badger and Sport,' 'Brock's Own Story,' 'Varia.' They are written in a pleasant style, and will interest



both sportsman and naturalist. We are permitted to reproduce one of the illustrations.

Notes on the Blue-Green Algæ, by **Harold Wager, F.R.S.** Pp. 48. A. Brown & Sons, Ltd., Hull, 2s. 6d. Our readers have long been familiar with the important researches of Mr. Wager on several lowly groups of organisms—fungi, algæ, flagellatæ—and the value of his contributions to science in these branches is universally recognized. The present well-printed volume, the substance of which appeared in the pages of this journal for 1913, is related to his prolonged studies of the difficult and complex structures of the cell-contents of the blue-green Algæ. In the course of these researches the author has experienced the difficulty of deciding on the presence or absence of a sheath. In many species of *Phormidium* the sheath is so thin and transparent that unless staining reagents are used it is extremely difficult to make out this determining character. He has, therefore, drawn up a series of characters which he has found most useful in the preliminary diagnosis of fifty species of *Oscillatoria* and thirty-seven species of *Phormidium*. The work, however, is much more than a key. The interesting introductory chapters render it very useful for students of these plants, and deal with the leading facts of the structure and functions of the cells, reproduction, and classification. Then follow keys to (1) the orders and families of the group, (2) the genera of Oscillatoriaceæ, and (3) the species of the genera *Oscillatoria* and *Phormidium*, concluding with a useful glossary of technical terms.

Whitby in 1796, showing undercliff, etc., now washed away.

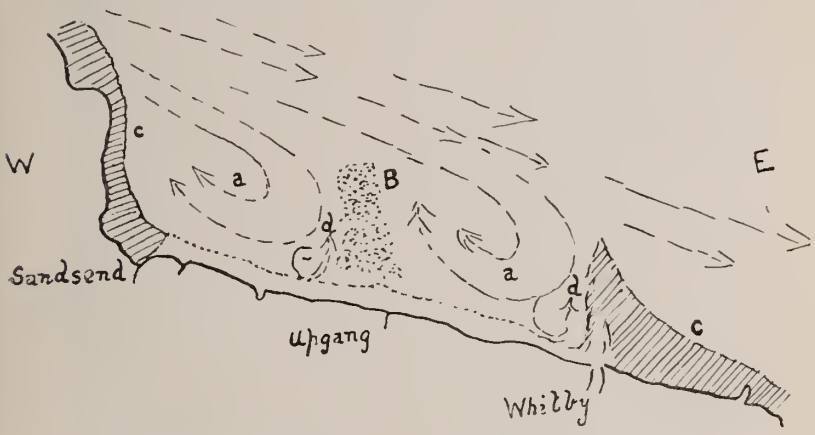
COAST EROSION AT WHITBY.

J. T. SEWELL.

(PLATE IX.).

THE cliffs east of Whitby have fallen more than usual recently owing to the excessively wet winter of 1912-3, though any alteration is hardly noticeable; indeed it is many years since any change of the cliff foot has taken place.

The shale forming the ground of the Scar has been found by borings in connection with the pier extension, to be ten feet thick at a distance of 200 feet from the cliff; the same bed has only a thickness of four feet a little below water mark. As the beds north and south appear level, if not



Direction of the rising tide in the Whitby-Sandsend Bay.

a a.—Currents influenced by rocks B and C.
d d.—Back current dangerous to bathers
c c.—Shale more or less uncovered at low water
B.—Sandstone always covered at low water.

rising towards the north, this difference only allows for very slow erosion.

Young, in his 'History of Whitby,' gives several measurements of the distance between the cliff-edge and the Abbey, existing in 1816.

West of the harbour are three miles of sandy shore with, except at the extremities, a continuation of clay cliffs. This bay is bounded on the west by Sandsend Ness with its long foot of shale, visible at low water. In the centre are the Upgang Rocks running directly seaward from near the shore, while the east end is enclosed by the Whitby piers, recently

extended a further 500 feet, and built on the edge of a line of shale which runs north for nearly half a mile. These three points of rock regulate in great measure the denudation of the cliffs and the shore of the bay, for the rising tide is diverted by them and made to flow in a westerly direction, and with the help of certain winds, not infrequently removed the sand from the more easterly end of the bay. However since the extension of the piers the curve of the current has been removed further seaward, and the sand is now deposited in much greater quantities at the foot of the cliff.

I recently saw an old painting, dated 1796, showing undercliff immediately west of the present coastguard station, near the pier. This undercliff had, in earlier times, been a place for fairs, etc. It had apparently disappeared in 1840, as at that date the cliffs are spoken of as rising perpendicularly from the sand, as they do to-day. The painting also shows a path* leading to the top of the east cliff, and on the sea edge. This has since gone. I am permitted to reproduce a photograph of this painting (Plate IX.). Since 1840 large quantities of clay that were thrown over the cliff face when the West Cliff estate was first built upon have been washed away.

At the Sandsend part of the bay, the shore at Sandsend Ness has been lowered from ten to seventeen feet as a result of the blasting away of the jet-rock which formed its surface. This took place between 1860 and 1868, and continued perhaps a little later. I remember the beach at Sandsend being at times level with the present sea-front—pigsties and sheds existed on the sand near East Row stream—a pathway, in part bordered by shrubs, was at the cliff foot for part of the way between Upgang and Raithwaite; and an inn, with two lime-kilns to the seaward of it, at Upgang. All these have disappeared, I believe as the result of the lowering of the shore at Sandsend point, thus allowing the rising tide to flow over the rock into the bay from the west many hours earlier.

Previously, the rising tide flowing against the Upgang rock had turned westward for a longer time, and deposited sand in the angle of the bay, from which it would not easily be removed except by the strong north-east storms which occasionally visit the coast. This is perhaps best explained by the sketch given on the previous page.

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We learn from a Hull paper that 'Some surprise has been expressed that a bigger attempt was not made to capture the seal which was seen in the Humber recently. It is probable that the men at St. Andrew's Dock remember realising only 4s. 6d. for a "Porpus" seal they once caught.' We had not heard of this new form of seal or would certainly have bid 5s. for it!

* Made by a member of the Cholmley family.

THE HABITS OF THE MERLIN.

E. WILFRED TAYLOR.

(PLATES X. AND XI.).

DURING the last few years I have observed from cover, the actions and habits of the Merlin at five different nests, and spent many interesting days thus concealed, usually within three yards of the nest.

The first nest I found was in the middle of a clump of tall and wiry old heather, and before reaching it I had the pleasure of seeing the hen bird rise up from the nest and commence to circle round overhead, kek-keking in the manner peculiar to so many of the rapacious birds.

A shepherd had found this nest a few days previously when the young were only two or three days old, and a friendly keeper had constructed near by a shelter composed of heather built around a light cane structure. This was about thirty feet from the nest, a thick little clump of heather being intended for the camera. Having first arranged and concealed the camera I entered the hut at about 9-30 a.m. The young were then about a fortnight old and seemed very sleepy. I waited until about 6 p.m., the young having done little but sleep all day, evidently having had a very heavy feed early in the morning and the only evidence I ever had of the presence of the adults was the occasional kek-keking overhead. I came to the conclusion that the young were fed early and late, and decided to be up in good time on the morrow.

On the following morning I left the keepers' lodge at about 5 a.m., with camera and some old sacking, as the day promised rain. Half an hour later I was safely concealed in the tent, and three eventless hours followed, the sky having meanwhile darkened and a thunderstorm commenced. Except for the first few days the young are rarely brooded even during very heavy rain, and in this case they were soon soaked through, but nevertheless seemed lively and expectant; at times they almost wandered out of the field of view. At 8-30 I heard a rustling of wings and the female alighted on the shelter above my head before flying down to feed the now clamorous young with a small passerine bird which she had previously plucked. She paid no more visits until late evening; this and early morning appeared to be the recognized feeding times at this nest. On one occasion I had an excellent view of her chasing away a pair of carrion crows that chanced to fly over the nest, and I saw her strike at the hindermost one.

The second nest was away on another moor, and contained four eggs. From these one usually flushed the female bird when about fifty yards from the nest; she would then rise up and commence circling overhead, uttering her alarm notes.

This bird seemed very shy and I erected a heather shelter about forty feet from the nest, the heather between it and the nest being bent aside to allow a clear view of the nest and bird. Two long waits at this nest resulted in absolutely nothing either seen or heard, and I finally abandoned the attempt, not wishing to cause her to desert. The eggs eventually hatched but the young were all drowned later during a very severe storm. This was the more regrettable as I do not suppose she would nest again, and the keepers tell me that their experience confirms this, though there are authentic records of the Merlin laying again when her eggs have been taken.

The third nest was situated in deep heather in a little valley and near the bank of a small moorland rill. It contained four young, perhaps a fortnight old. I spent nearly a week watching at this nest and had quite an interesting time. On this occasion I was hidden with my camera, and only about eight feet from the nest. Photographically the conditions were very bad.

The young were fed in the morning and late afternoon principally, as I think they usually are at this stage—daybreak to 11 a.m., and 4 p.m. to dusk. The food consisted of small passerine birds which were previously plucked, and which I judged to be chiefly pipits; these she usually screened from me with her body, and it was impossible, as a rule, exactly to determine the species. I could always tell when she was approaching the nest as the young followed her every motion with intense eagerness, and I could see the four fluffy white heads all moving together. As she neared the nest the excitement increased, until as she alighted they would all scramble towards her on their ankle joints, almost climbing over one another in their efforts to be first. On alighting she usually had a good look at my shelter, and feeling reassured she would commence to tear up the prey into small pieces, dealing them out carefully, and watching how each piece was swallowed. Her patience was wonderful, and when one of the young had difficulty in swallowing an awkward piece she would gently take it away and readjust it, aways returning it to the same youngster. Most of the food went to the three larger birds, evidently females, while a young male in the nest had hard work to get any. If one of them grabbed a piece she offered to another she would take it away again, and I thought as I watched her that she was a very fair and gentle bird, except where the young male was concerned. I thought also that she took a very obvious pride in her progeny. I had to keep exceedingly quiet in the tent, the slight click made by my shutter always sending her screaming off. The cock bird at this nest did most of the hunting, and his usual practice was

Photos by] [*E. W. Taylor.*

Merlin and Young.

Photos by [*E. W. Taylor*

Merlin with Young.

to fly up towards her, the prey in his talons, and drop it, when the female, with a neat swoop, would catch it before it reached the ground.

An unusual exchange took place just above my head when the male gave the prey into the talons of the female in mid-air.

A slow exposure was necessary at this nest, because of the bad light, but she would rarely keep still for an instant. I usually waited until the meal was quite over, when she would stand still for a fraction of a second before flying off. This chance, because of its brevity, I missed as often as not, only obtaining a few very poor results.

Altogether I spent about a week at this nest, averaging about three exposures a day, for which I endured much discomfort. All four of the young grew up into fine young birds and I hope some of them are alive to-day.

The fourth nest was on the top of a flat moor and, as, usual, in a deep clump of old heather. When first discovered by a keeper it contained four eggs, and I started off one morning with a tent and camera. As we neared the nest the hen flew off, and we found to our sorrow that all but one egg had been sucked, presumably by crows. We erected the tent and covered it with heather until it appeared part of the landscape, and I settled down inside. Soon the rain poured down in torrents until the top of the tent was a pool of water many inches deep, the weight of which would have broken the pole but for my support. As it was I was in a state of apprehension lest it should start to leak through. About once an hour the Merlin flew over, kek-keking; she flew low and did not seem inclined to return, possibly because she had only one egg left and did not think it a sufficient attraction. No visits were paid all day, and so in the evening we took up the tent, but she did not even then return. This we attributed to the sucking of the eggs, having known of similar cases with other birds.

The fifth nest proved more interesting than all the other nests put together. It was very near the site formerly occupied by the first nest, and contained four young about a fortnight old. They were very vicious little fellows and would all lie on their backs with their claws in the air if one approached them. The hen bird, when not hunting or feeding, was always to be seen perched on a knoll of heather about 200 yards away. From this coign of vantage she kept watch, and as we approached she would take wing and soon be whirling overhead, kek-keking vehemently. I was astonished to see in the nest the remains of larger birds than I have ever seen before at any Merlin's nest, the legs of a third-grown Lapwing and the wing of a mature Sandpiper. We erected the tent very carefully, with a view to making it as little conspicuous

as possible, and covered it over with heather. At about 9 a.m., one morning I took up my quarters, and was soon interested in a local guide book, when she flew low over the nest, kek-keking. Afterwards this was always my signal to clear decks for action as she invariably flew low over the nest before feeding, and if the young were enthusiastic in their response she would come and feed them within a couple of minutes—if, however, they appeared sluggish and sleepy, she would delay the meal.

Up to this time the young had been asleep in a bundle, looking like a bunch of cotton wadding, and it seemed curious that a note, to my ear precisely like the one she had uttered in alarm, should make the young squat in the one case and so keenly agitated in the other. A moment later she flew down to the nest, and the young scrambled towards her. At this stage, as I could not see her very conveniently, I pressed back the side of the look-out hole with the tip of my finger, and the next moment there was a whirr of wings as she precipitously left the nest screaming, much to the disappointment of the young, who all followed her disappearing form with their eyes, their grave concern and disappointment being very evident. The average number of visits per day was six, and usually there were none between 11 a.m. and 4 p.m., which coincided with previous experience.

After about half an hour she returned with a plucked bird which I believe she had received from the male. One could rarely determine the species except by examination of the remains left in the nest, usually heads, wings, and legs. This time I kept very quiet but she was cautious and kept as far from the tent as she possibly could all that day, being generally completely concealed from the camera by the heather. Once she had started feeding the young they made such a noise that any movements of mine were unheard and by not commencing to move until this noise commenced I found I could change plates and set shutters with impunity. However, she would not abide any movement and would detect immediately the least motion of the tent cloth caused from inside. She fed the young with the same care and tenderness that I had noticed at other nests, tearing her prey, usually a thrush, into minute pieces, and dealing them out in turn, except in the case of another rather small youngster. Even the insides were divided up, only the bones of the sternum, head, legs and wings remaining, the bones of the breast girdle usually intact. I never saw her tidy up the nest at all, although I knew she did so, but Mr. Grabham, who spent some time in my tent, saw her go round the nest collecting remains of birds, which she removed. The nest proper is always surrounded by a wide circle of excreta, and as it becomes unsanitary the young move to a fresh spot. This always happens as far as my observations go.

Naturalist,

I was frequently much amused by watching the young birds beguiling away the time—they slept in a bundle most of the day, but awoke as their appetites began to increase, one especially used to amuse herself by gnawing a heather stalk with her beak; when tired of this she would put it down and snatch at it, playing at times almost like a kitten. Much time was also spent preening, and by mutual consent each would preen another. Sometimes they passed the time rubbing their beaks together, after the manner of adult Gannets.

There are many who assert that in doing this the young Merlins are merely obeying a world-wide law which causes them to use their muscles as they will eventually be used in earnest, and to strengthen them for that time. To this, I heartily agree, but I can give no support to the naturalist who denies that wild creatures derive any pleasure from such exercise; on the contrary I believe they enjoy these games.

At this nest the male bird, I believe, did all the hunting, the female sometimes bringing birds to the nest in such quick succession as to make it impossible for her to have caught them herself, though as she usually averaged twenty minutes or so at the nest there was plenty of time for the cock to have done so. I imagine that the male must have been very unusually bold and aggressive, as the variety and size of the birds brought to the nest absolutely astonished me.

The following certainly fell victims to his beak and talons:—Blackbird, Song Thrush, Ring Ouzel, Willow Wren, Starling, Pied Wagtail, Chaffinch, young Cuckoo, young Golden Plover, young Lapwing, Meadow Pipit, young Grouse, young Partridge, young Woodcock, Hawfinch, Sandpiper, Snipe, and Greenfinch. Surely a terrible list. However I think it an absolute mistake to judge all Merlins by a single pair; rather say that out of five pairs four will probably devote themselves exclusively to the small passerine birds, while the fifth may stop at nothing.

I don't suppose I can adequately describe the pleasant thrill that went through me every time I watched this fine bird feeding her young almost at my very feet; it always seemed so strange to watch such a shy and suspicious bird behaving as if there were no human beings within miles, and this is a sensation that never wears off as far as I am concerned. I have never yet observed the cock bird visit the nest, although I have no doubt he will do so on occasions.

It is not at all a rare thing for merlins to fight, and curiously enough two hen birds will often fight over a nesting area. A keeper friend was out on the moors one day when he heard the familiar kek-keking of a Merlin, but was much surprised to find no Merlin in sight. As he walked on the sound came nearer, until as he stood by a clump of deep heather the kek-

keking came from the ground almost at his feet. He advanced a little further, when looking over a knoll of heather, he saw two hen Merlins locked in each others talons. He watched them for a minute or two and says he could have picked them up. However they eventually separated out and flew away. A nest was situated in the clump of heather at the time.

I believe the average Merlin does very little harm on a grouse moor, and keepers I know, who afford it every protection, believe they lose little or nothing by so doing. Certainly they are a most delightfully sporting bird, and if they deprive us of all our rapacious birds, we shall have lost some of the most interesting species to be found on this island.

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The **Journal of the Northants Natural History Society and Field Club** for 1913, besides many notes of antiquarian and general interest, includes some very interesting notes on the Waters and Wells of Northants, by Mr. B. Thompson ; notes on the birds of the county by Mr. J. D. Cotton ; *Apium Moorei* (Druce) in Northants, by Mr. G. C. Druce ; Notes on Algæ by Mr. G. H. Goode ; Additions to the Herbarium, and Meteorological Reports.

The **Transactions of the Manchester Microscopical Society** for 1912 have just reached us, and contains the following papers :—the President's Address on ' Species, Varieties, and Hybrids,' by Professor F. E. Weiss ; ' The Microscopical Examination of Metals,' by G. E. Buttenshaw ; ' On the Podura Scale,' by E. W. Napper ; ' The Myxophuceæ,' by Charles Turner, and ' The Preservation and Storing of Photographic Negatives,' by R. Pettigrew. There is also an account of the rambles. The Society is to be congratulated on the continuance of its excellent work.

Volume XIX. of the **Transactions of the East Riding Antiquarian Society** (A. Brown & Sons) contains two papers by the Rev. C. V. Collier, viz., ' Documents at Burton Agnes,' and ' Some East Riding Disputes.' Colonel Saltmarshe gives ' East Riding Levies for the Scotch Wars in the Reign of Edward II. and III., with Remarks on the Feudal System ' ; Canon Lambert writes on the ' Trade Gilds of Beverley,' and the Editor, Mr. Sheppard, gives a lengthy article on ' East Yorkshire History in Plan and Chart,' illustrated by reproductions of several old maps.

Annual Reports, Proceedings, etc., of the Barrow Naturalists' Field Club, etc., Vol. XX., for the years 1910-1912, published 1913. In this part the Barrow Society has brought its Proceedings up to date. Besides records of the work of the different sections, the publication contains abstracts of papers read on various subjects, such as Australia, dreams, saxifrages, fungi, wit and humour, Ireland, proverbs, Michael Angelo, New Zealand, etc. Perhaps the most valuable contribution is by Mr. George Grace, and deals with the Glacial Geology of the district around Barrow.

The Proceedings of the Liverpoool Geological Society, in addition to the presidential address of Mr. C. B. Travis, contain geological notes on ' Recent Dock Excavations at Liverpool and Birkenhead,' and also ' Man's Place in the Geological Record,' by J. C. M. Given ; ' Notes on Recent Excavations in Lime Street and Church Street, Liverpool ' by T. A. Jones ; ' Some Notes on the Geology of the Antarctic,' by A. W. Harris ; ' The Storeton Find of 1912,' and ' Note on a Map of the Faults in The Neighbourhood of Storeton, made by the late Mr. G. H. Morton,' by H. C. Beasley ; and ' The Boulder Clay of North Wirral,' by W. T. Walker.

HOLOCENE MOLLUSCA FROM CLAPHAM, YORKSHIRE.

J. WILFRID JACKSON, F.G.S.,
Manchester Museum.

THE shells referred to in this paper have all been collected from the talus masking a small cave or 'rock-shelter,' known locally as Foxholes, on the left side of Clapdale, a little below the famous gorge of Trowgill.

The cave is about 1,000 feet above sea-level, and is situated at the upper end of a small gorge cut back into the slope of the hillside through the undermining of the massive beds of Carboniferous Limestone.

The shells occurred in a well-defined zone about 6 feet below the top of the talus at a point about $3\frac{1}{2}$ feet outside the present line of cliff, and probably belong to a period when the cliff-face was relatively nearer to Clapdale than at the present time.

They are evidently of some antiquity and the accumulation is obviously due to the washing down of dead shells from the higher slopes above the cave. Judging from their abundance and the restricted area of their distribution, a cliff must have persisted here for some considerable time; then the 'overhang' gradually receded by the continued falling away of large and small fragments, until the face was cut back to its present position.

The shells are all typically damp woodland species and characteristic of the Mountain Limestone, but their present-day representatives are almost all found at much lower altitudes in the district.

If comparison be made with Mr. W. E. Collinge's list of Clapham and District Mollusca, published in *The Naturalist*, for April, 1890, (p. 109), it will be seen that all the species are living in the district at present, along with many others not yet found in the talus at Foxholes. Among the abundant living forms absent from the talus are:—*Pyramidula rupestris*, *Vallonia costata*, and *Clausilia cravenensis* (=var. *dubia* of *Cl. rugosa* of old lists). This absence may be accounted for by the fact that the above-mentioned forms are not essentially woodland species.

The abundance and large size of some of the forms, in the talus, notably *Hygromia rufescens* and *Vitrea cellaria*, is a remarkable feature. Among the shells of the latter there is one example considerably larger than its fellows, measuring 14.5 by 7 mill, and agreeing in this respect with the large Irish form described by Mr. A. S. Kennard as *Vitrea hibernica*. The average size of the remaining shells of *V. cellaria* is 12 by 6.5 mill.

It is difficult to estimate the age of the talus shells, but there is good reason to think that they date from Neolithic times.

The following is the list of species found in the talus up to date. Where not stated, the species were common :—

Limax maximus Linné. One shield.
Agriolimax agrestis Linné. One shield.
Vitrina pellucida Müll. Three examples.
Vitrea crystallina Müll. Large and abundant.
,, *cellaria* Müll. Large and abundant.
,, *rogersi* B.B.W. (= *glaber*, etc.). One example.
,, *alliaria* Müll. Only one example.
,, *nitidula* Drap.
,, *pura* Alder. Only a few examples.
Euconulus fulvus Müll.
Sphyradium edentulum Drap.
Pyramidula rotundata Müll. Abundant.
Hygromia granulata Alder (= *H. sericea* Jeff.). Few.
,, *hispida* Linné.
,, *rufescens* Penn. Large.
Acanthinula aculeata Müll.
,, *lamellata* Jeff.
Helicigona arbustorum Linné.
Helix nemoralis Linné.
,, *hortensis* Müller.
Ena obscura Müll. One example.
Cochlicopa lubrica Müll.
Azeca tridens Pult.
Jaminia cylindracea da Costa.
Vertigo pusilla Müll.
Clausilia laminata Mont. Few.
,, *bidentata* Strom. Few.
Carychium minimum Müller.
Acicula lineata Drap. Few.
Helix spp. Several eggs; two sizes.

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In reference to the notice in the February issue on 'The Secrets of Nature Exhumed,' by Lady Blount, F.R.S.L., F.S.A., etc., her ladyship asks us to state that it is a mistake to make it appear that she speaks of our universe as being a '*planet*,' as she maintains and teaches in all her writings and lectures, that we are living in an *Enclosed World*, and that all the space that man can trace is *in* (within) our universe. Lady Blount further remarks, 'Referring to your "modern expression" of "pulling the leg," *it* is quite in *harmony* with *modern* "science." But I wish that I could only return the compliment and say that "*I know* that the arch enemy of Lord and Man has not been 'pulling' the *brains* of your reviewer who admits that he does not know or understand what he upholds" when he states that he is "not an astronomer."

If men were taught to reason well,
They'd ne'er feign to believe
What they don't understand, nor swell
The throng who thus deceive.

However, A. T. Swaine, or anyone who upholds the whirling globe, sea and earth idea, whether (in its origin) they make out it was a cinder shot from the sun, as per the Nebular Hypothesis, or by "Stellar Cycles" or any other assumption, the globe theory can never be in harmony with the Bible account of the Six Days' Work of Creation of our World, and mine is the only teaching in harmony with both the Bible and Geology. Of course any figures can be made to agree if so arranged, and also to *appear* to agree with facts when they *really don't*.'*

Our reviewer has seen Lady Blount's letter and desires to add nothing further, being quite satisfied that her letter conveys all that is necessary].

* The price of the book is 1s. 2d. by post, from Lady Blount, 35 High Street, Worthing.

NESTING HABITS OF THE STONE CURLEW.

E. W. WADE, M.B.O.U.

In November, 1908, I read a paper to the Vertebrate Section of the Yorkshire Naturalists' Union on the Stone Curlew, and since then have had opportunities of photographing and studying the nesting habits of this bird. The habit of nesting in plantations is one to which our Wold birds are specially addicted. It is mentioned by Stevenson, in 1867, but he says that 'as soon as the trees attain any size all attractions cease.' It is a matter for congratulation that in our county wooded districts, and those of considerable age, form its main shelter, for without the friendly co-operation of the keepers, which we have secured, the species must soon become extinct, as there is but little other Wold country left where it can escape persecution. This year I was fortunate in being able to visit the 'breck' country of Norfolk, where the bird is still fairly plentiful, and where it appears, owing to the frequency with which it is brought into contact with man, to be less shy than our home birds. On 11th May, 1913, I put myself under the care of a keeper well acquainted with the habits of the bird, and made arrangements to photograph it on the nest. Having no shelter tent with me, I constructed a bough shelter beneath an isolated Scotch fir about eighty yards from the nest. We made a stack of turf overnight, at a distance of three feet from the nest, and next morning a quarter-plate camera was inserted in a hole cut in the side of this and a string led from there to the shelter. At 10-15 a.m. the keeper left me in the shelter. Very soon after, both birds appeared beneath a Scotch fir 150 yards away, close together. They commenced running backwards and forwards, gradually approaching the nest, till the hen settled down on the eggs, when the cock bird was preening himself twenty yards from her. He then left her to the duties of incubation. After exposing the plate, I left the shelter, when the bird ran a few yards, and then flew off close to the ground. Four times I went out to change the plates, twice accompanied by the keeper, and twice alone. When the keeper was with me she took twenty-five and fifteen minutes to return to the eggs, when I was alone the time was forty and thirty-two minutes, and in this latter case the run backwards and forwards was very much extended, especially on the part of the hen bird, who seemed anxious to see all round my shelter before returning to the eggs. Three times she sat with head up wind, once down wind. Three times with the direction of the longer axis of the eggs, and once across it. Occasionally she sat up and turned the eggs. The method of leaving and returning to

the nest showed no variation except in the length of the return run which sometimes commenced 300 yards away, and at the fourth attempt she became distinctly more suspicious. The fact of her quicker return when the keeper had left me showed a certain amount of reasoning power, but as regards the management of the eggs, she showed none, for one of them which had rolled into a corner of the depression in which she sat, had been left stone-cold and unincubated, while the other had a young one chipping out. In this respect she resembled the guillemot, which leaves any egg that rolls a few inches away into a slight crevice from which the bird could easily extricate it. Two days later the young curlew had hatched out and gone, while the cold egg remained behind.

The most conspicuous features of the birds were the yellow cere and staring yellow iris, and the light brown cheek which seemed to stand out from the head. The colours on the head of the cock bird appeared more pronounced than on that of the hen.

The second attempt at photographing the bird was made on the 26th May, with a shelter tent. The nest was close to a wire fence which had been repaired early in May, and the bird had been kept off the eggs thereby for the greater part of two days. The shelter-tent was placed three feet from the nest and half-height only, on 25th May, and on 26th, at 10-15 a.m., the keeper put me into the tent. It was a sweltering hot day. I sat down with my watch expecting to have to wait fifteen minutes, but in five minutes heard a throaty clucking note like that of a brooding hen, and looking through one of the peep-holes saw the bird sitting three feet from me, her great yellow irides staring apparently at me, and her mouth wide open, panting from the heat. So close did she sit, that to obtain a photograph of her standing up, I had to tap on the side of the tent, and in twenty minutes I had fired off all my plates, and was packing up the tent. As I found the eggs to be addled, I removed them, in kindness to the bird, but her heart-rending cries when I had walked 300 yards away, resembling very much the alarm note of the common curlew, made me regret that I had not left her to her futile maternal cares. No doubt this bird's tameness was due to the fact that the keeper's duties often led him across the field, and individual birds show different degrees of shyness. Here again, in regard to the condition of the eggs, an utter want of reasoning power was apparent. The bird must have been sitting three weeks on addled eggs, becoming more closely attached to them as the days passed by. The brooding note, I think, has not been mentioned by previous writers. Possibly it might have been due to the long period of incubation.

POA IRRIGATA *LINDMAN* IN BRITAIN.

G. CLARIDGE DRUCE.

Two years ago Professor Lindman, of Stockholm, sent me his description of the above plant, which appeared in the 'Botaniska Notiser' for 1905, and he also told me about it during our long journey with the International Phyto-geographical Excursion through the British Isles in 1911, when, however, he saw nothing he was able to refer to it, albeit the extraordinary dry weather of that year was quite unfavourable for the collection of grasses, which were well nigh over at that time. But from what he told me I felt quite certain it would be found to be included in my large collection of *Poa pratensis*. When Professor Lindman was staying with me recently he was unhesitatingly able to name several plants in my herbarium as this species. In each case they had been marked by me as a variant of the aggregate *Poa pratensis*. The earliest one was gathered in 1889, at Padworth in Berkshire, when I thought it was a distinct form, but Hackel put it under *pratensis*, and as a forma *umbrosa* of that species it is alluded to in my 'Flora of Berkshire' (page 580, 1897). This is not typical *irrigata*, but Lindman's forma *aucta*, a larger and more lowland plant. The first published reference to it is, I believe, to be found in the 'Annals of Scottish Natural History' (1895, page 37). A curious form of the *pratensis* group which I gathered on the Cnochan rocks (an interesting portion of country mentioned by Lightfoot in his 'Flora Scotica' as the habitat of *Dysar* and other rare plants, which extends into both Ross and Sutherland), gave me considerable trouble, for it was quite new to me, and, indeed, so different was it from *P. pratensis* that one of our best botanists named it *Poa glauca*. Eventually Professor Hackel considered it best to refer it to *Poa humilis* Ehrh., a definition which, as we shall see, was extremely close to the truth. In the same year, and also in 1896, I gathered an allied—although not identical—plant in small quantity high up on Ben Lawers. This excited a great amount of interest, for the gathering (No. 2512) was at first referred to *P. cenisia* var. *flexuosa* Wahl., by Professor Hackel, and as such I recorded it [l.c. 122 (1898)]. On subsequently comparing it with authentic specimens of *flexuosa* from the Dovrefeld I felt they must be distinct. Therefore, in July 1898 I again visited Ben Lawers, when only a few specimens identical with 2512 were obtained, although many others were closely allied to it. At that time Mr. H. Fisher was paying some attention to the genus *Poa*, so I sent him all my gathering, when he also determined 2512 to be *P. cenisia*, var. *arctica* R. Br., but

1914 April 1.

stated that he had found an interesting difference in the leaves and, suggested if I gave it a name that it should stand as *P. cenisia* All., var. *arctica* Br., forma *scotica*, and in November of that year wrote: 'very likely you would also find a character which would enable you to refer your plant with more confidence to either *cenisia* or *pratensis* (the latter of which I had suggested), or may be you could satisfy yourself that it ought to take much higher rank than a form of either.' The name *arctica* seemed, however, as inapplicable as *flexuosa*, and all the gatherings except the 1896 (No. 2512), which Mr. Fisher either lost or mislaid, were sent to Hackel, who, on 22nd March, 1899, wrote that he 'thought all the specimens must be referred to *P. pratensis*, var. *humilis* Ehrh., and the form identical with 2512 as a form which comes close to *cenisia*.' and remarked, 'surely you are right in observing that what I called *P. cenisia* is not identical.' These Prof. Lindman also determines as his *Poa irrigata*.

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TARAXACUM BALTICUM *DAHLST.* IN BRITAIN.

G. CLARIDGE DRUCE.

For several years—indeed, since the publication of Handel Mazzetti's 'Monograph' of the genus—I have searched the East Coast of England from Canvey Isle, north to Skegness for this plant, which, as it occurs in Sweden, Denmark, Northern Germany, Russia, and Finland, might be expected on that side of Britain, but I have been unable to meet with anything I could refer to Dahlsted's plant. In 1912, however, I most unexpectedly came across it in my own county of Oxfordshire, at Menmarsh, where it grows in small quantity, over a very restricted area, in a marshy field which is often under water, forming as it does a portion of the fenny tract adjacent to Otmoor. Dahlsted has described a somewhat appalling number of species of *Taraxacum*, but this is one of the few which is admitted to that grade by Handel Mazzetti in his 'Monograph' (page 87).

In our specimens, which Dahlsted says are a form of his *balticum*, the early leaves are very narrow and sub-simple, and recall those of *Ranunculus Flammula* rather than the Dandelion, while the phyllaries are broadly-ovate and appressed, and thus place it near *T. paludosum*. Dahlsted described it, I may say, in the 'Botaniska Notiser' for 1905. It may be added that the neighbourhood in which it grows also yields the very local variety of the Dog Violet, var. *lanceolata* Mart.-Donos, and is the sole surviving habitat in the county for *Salix repens*

FIELD NOTES.

BIRDS.

Crossbills near York.—On January 19th, 1913, there were about forty Crossbills in Crompton Wood, four miles from York. They were chiefly adult males, and were feeding on the pine cones. A gamekeeper caught some alive, but I believe they all died but two, which he gave to Mr. Zimmermann, one of which is still living in his aviary.—SYDNEY H. SMITH.

Waxwings at York.—Two Waxwings were seen in Messrs. Backhouse's gardens at Holgate, York, about January 10th, 1914, by Mr. W. Lund. They were on some evergreen shrubs near the edge of the gardens and were so close to the observer that their 'waxing points' could be plainly distinguished. Taking wing together they flew across the gardens in a S.E. direction, and were not again reported in this district.—SYDNEY H. SMITH.

Nesting of the Pochard near Selby.—On June 7th, 1913, Mr. V. Zimmermann found a nest of the Pochard, with seven eggs almost hatching, on Skipwith Common. Young Pochards were seen on the common on several dates during June and July by Mr. C. F. Procter, Mr. Zimmermann and myself, and on one occasion we had two nearly full-grown young ones under observation the whole of the afternoon.—SYDNEY H. SMITH.

Gannet Feeding its Young.—I think it is due to Mr. J. M. Campbell, of the Bass Rock lighthouse, who is a most painstaking observer, to point out the great difficulty with which the photograph of a Gannet feeding its young one, reproduced by you (*The Naturalist*, January, Plate I.), was obtained. It was only secured, after many unsuccessful attempts, and by dint of going down the cliff one hundred and fifty feet on a rope—a hazardous proceeding at any time, but especially so in the present case, because the photographic apparatus had to be strapped on to the climber's back. Then by lying motionless for hours among the nests, it was accomplished, and a scientific fact of great interest to ornithologists was placed beyond cavil by Mr. Campbell's exertions.—J. H. GURNEY, Keswick Hall, Norfolk.

Destruction of Woodpigeons.—Following the example set in the South of England of appointing a special day for the farmers and sportsmen over a given area to harass and destroy as many Woodpigeons as possible, a crusade was arranged in the Nidd Valley and adjacent districts, with Knaresborough as the headquarters and organizing centre.

As we are never in this district visited by the great hosts of pigeons which now and then descend upon portions of the East Coast and the South of England, the necessity of this organized destruction is not altogether apparent. A total bag of 605 birds was secured over a wide area. It is interesting to note that one bird shot at Roecliffe was found to have in its crop 871 oats, two barleycorns, and a small quantity of greenstuff, while another contained two handsful of clover. The contents of a third crop was ninety-seven field-peas and a few leaves, while a fourth contained nothing but green leaves, seventy per cent. of which were the young leaves of the hawkweed, the remainder being buttercup, sour-dock, dandelion, and a few clover. As farmers class both the Ringdove and Stockdove as Stockdoves, it is quite possible that the latter bird was really a Stockdove, for as Mr. St. Quintin and Mr. F. Boyes have recently clearly shown in 'The Field,' the Stockdove rarely does any damage to the farmer, its food consisting mainly of the seeds and leaves of more or less harmful weeds. For this reason farmers would do well to discriminate between the two species.—R. FORTUNE.

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MAMMALS.

Badger Notes.—At Aldborough, near Boroughbridge, on Friday, 22nd March, a sow Badger (weighing 22 pounds) was observed entering a disused fireplace originally used for heating a greenhouse. She was captured, with some difficulty, and confined in a washhouse, her detention being made additionally secure by a collar and chain. The captor proudly displayed his prey to admiring friends on Saturday and Sunday, but on Monday morning the captive had fled. She had managed to slip the collar and push some stones away weighing about threequarters of a hundredweight. To tear a hole in the door proved an easy task, and this led her into a coal-shed with a window, open about two inches. This she pushed open, and then, breaking a way through the bottom of the yard door, she, we are glad to say, made good her escape. Last year I had quite a small Badger sent to me, but I could not find a secure abiding-place for her—she burrowed out of every place in which I confined her. After being recaptured about half a dozen times, she effected a complete disappearance. A fortnight after I was requested to go to a garden about a mile away to inspect a strange animal which had made a tremendous burrow in the ground. 'My Badger!' said I. The surmise proved correct, but she had effected a retreat a short time before my arrival, being seen going across a field and some gardens. Nothing further

was heard about her for a week, when two men with something in a sack called at my house on Sunday morning to ask if I had lost a Badger, as they had caught one which had destroyed seventeen prize chickens. Under the circumstances I thought it inadvisable to claim proprietorship, and upon the animal being turned out of the bag I could only say it was very like one I had, but I could not swear to it. However, it seemed the captors were only anxious to have possession of it themselves, and needless to say, I was glad they should, I thus escaping any possible demand for the value of the chickens.

Another amusing experience with a big boar Badger once befel me. I kept him a short time for the purpose of photographing him. One Sunday afternoon I released him in an enclosed green, carefully barricading the exits about five feet high. After a time he suddenly made up his mind that he had had enough of me and my camera, and set off with a speedy unweildy gallop down the path, clearing the obstacle like a hunter, and then into the open street. He ran along at a rattling pace, with myself, hatless, in pursuit. Eventually he went to ground in the window-area of a house belonging to some maiden ladies, who were terrified at the appearance of such a ferocious (!) animal. I got a sack which I placed over him, and thus ignominiously carted him home. He was, however, set at liberty a day or two after.—R. Fortune.

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FUNGI.

***Polyporus giganteus* as a timber-destroying Fungus.**—About mid-day on Sunday last, 15th February, during a violent south-westerly gale a large Beech tree in Miss Arkwright's garden at the Gate House, Wirksworth, was uprooted and fell with a tremendous crash. I had noticed last summer a profuse growth of the many-lobed pilei of *Polyporus giganteus* round the roots of the tree, and then expressed the opinion that its ultimate fate was sealed. In a gale some four or five years ago a Beech tree elsewhere in the town was blown down, and this too was badly attacked by the same fungus. In both cases the roots of the tree were badly decayed by the action of the fungus and the trees were completely undermined. Massee, in his 'Text Book of Plant Diseases' (1st edition, p. 198) says of *Polyporus giganteus* that it 'Often springs in dense masses from the roots of living trees and is probably parasitic.' —Thomas Gibbs, Wirksworth.

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MOSSES.

***Hookeria læte-virens* Hook. and Tayl. in West Lancashire.**—I have just been looking over my collection of

British Mosses, and find that I gathered this rare and interesting moss at Wyresdale, in April, 1903. This I believe is the first and only record of this species for the County of Lancaster. —W. W. Mason. Melmerby Rectory, Cumberland, March 14th, 1914.

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SHELLS.

Rare Shells at Filey.—In examining some shell-sand found at Filey I came across the following, which were not found at the Marine Biological Meeting last year:—*Nuculana pygmæa, Montacuta substriata, Lepton nitidum* var. *convexum, Syndosmya nitida, Sphenia binghami, Rissoa inconspicua.* With the exception of *Sphenia binghami* they are all very rare on the Yorkshire coast and have been seldom recorded.—F. H. Woods, Bainton.

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FISHES.

Large Perch at Stamford Bridge.—A fine perch, weighing $1\frac{3}{4}$ pounds, was caught in the River Derwent on February 28th, 1914, by a York angler. I obtained it and it is being preserved.—Sydney H. Smith.

Large Grayling in Yorkshire.—A brace of fine Grayling was caught in the river Derwent at Ganton, on February 28th. One of which, weighing 3 lbs. 4 ozs., is the largest I have any record of for Yorkshire streams. The second weighed $2\frac{1}{2}$ lbs. a very fine fish for Yorkshire, where such a weight is not usually attained.—R. Fortune.

The *Annual Report of the Salford Art Gallery and Museum* shows there has been a marked increase in the attendance at the Museum, 'due to a large extent to the removal of the stick room restrictions, the opening of the Museum on Fridays, and to the fact that through the kind co-operation of the Education Authorities, it has been widely made known that the visits of well-behaved school children are always welcomed.'

A Manual of Petrology, by **F. P. Mennell.** London: Chapman and Hall. 256 pp., 7s. 6d. net. The present work is founded on the same author's 'Introduction to Petrology,' published in 1909, but as the changes have been so extensive, according to the author, it has seemed advisable to give it another title. Personally we think the author has made a mistake, and should have called it a revised edition of his former work, which would have been quite accurate. We do not think English petrologists will find much in this that cannot be found in many other well-known works. There is, however, a strong South African flavour about it, and most of the illustrations are drawn from that locality. To English geologists in Africa we recommend the work.

In Memoriam.

MAJOR G. BARRETT-HAMILTON—1871-1914.

We are exceedingly sorry to record the death of a valued member of the Yorkshire Naturalists' Union, Major G. Barrett-Hamilton. He was of Irish nationality, and at an early age devoted his attention to the study of the mammals of the British Isles, upon which subject he was one of our leading authorities. He has been in correspondence with the principal naturalists of the country for many years. He was a voluminous writer and a careful recorder of notes and observations. The result of his researches was the 'History of British Mammals,' a magnificent publication, which has frequently been referred to in these columns. Fourteen parts have already appeared, and we are pleased to learn that arrangements have been made for the completion of the work, under the editorship of Mr. Martin C. Hinton. Major Barrett-Hamilton was investigating the southern whaling industry on behalf of the Colonial Office, when he died of heart failure in South Georgia, on January 17th.

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HORACE BOLINGBROKE WOODWARD, F.R.S., F.G.S.—1848-1914.

We much regret to record the death of Mr. H. B. Woodward on February 6th. He retired from his position of Assistant-director of the Geological Survey in 1908, and since then has been by no means inactive, and published a number of valuable volumes on geological subjects. He was a voluminous writer, and besides his contributions to various geological journals, and to the publications of the Geological Survey, he has written a number of books, the best known perhaps being 'The Geology of England and Wales,' the first edition of which was published in 1876, and the last in 1887. He was an authority on the Secondary Rocks, and on water supply. He received many awards at the hands of the Geological Society of London and other similar societies.

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ALBERT CHARLES LUDWIG GOTTHILF GÜNTHER—1830-1914.

Another worker in the paths of natural history has passed away in the person of Dr. Günther, who held a foremost position in the Zoological World. His scientific achievements in connection with the formation and arrangement of the natural history museum in London are well known, and his

numerous friendships resulted in the collections under his charge being considerably augmented. While he was thoroughly familiar with the various branches of natural history, the fishes and reptiles seem to have received greatest attention. His 'Introduction to the Study of the Fishes' is a standard work, which has been an indispensable handbook to the naturalist; while his contributions to *The Challenger* reports and his works on Gigantic Land Tortoises, etc., are all of world-wide reputation. Not only was Dr. Gunther a specialist in these subjects, but he was a very able field naturalist.

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SIR JOHN MURRAY—1841-1914.

We much regret to record that Sir John Murray was killed in a motor accident near Edinburgh on March 16th. Sir John was probably the foremost oceanographist in the world. He was born in Canada, and came to Scotland at the age of 17, and studied at the Edinburgh University. At 27 he went to the Arctic in a Scottish whaler, in the capacity of naturalist, and eventually did his excellent work in connection with the famous Challenger voyage between 1872 and 1876. He then had charge of the collections, and paid particular attention to deep-sea deposits. It was largely due to his enterprize and enthusiasm that the fifty large volumes containing the results of that expedition were published. He had considerable experience in Polar exploration, and more recently undertook some valuable work in connection with a bathymetrical survey of the Scottish fresh water lochs.

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FREDERICK BRITTAIN—1836-1914.

Frederick Brittain was one of the founders of the Sheffield Naturalists' Club. He was its first Hon. Secretary, Dr. Sorby being the first President. He wrote the article on the Botany of the district in the Sheffield Handbook of the British Association, and contributed various articles to *The Naturalist*. He also lectured to the local society on Desmids and Diatoms, Insect-catching Plants, the Natural History of Tangier, and the Foraminifera. He studied plant structures and animal parasites, microscopic slides of which he had a good collection. He was President of the Sheffield Naturalists' Club in 1878, and of the Literary and Philosophical Society in 1883-4. Mr. Brittain was for many years a member of the Advisory Committee to the Board of Trade, was an Alderman for fourteen years, and also a Magistrate. He was also a member of the General Committee of the Yorkshire Naturalists' Union.

VERTEBRATE ZOOLOGY IN YORKSHIRE.

Two meetings of the Vertebrate section of the Yorkshire Naturalists' Union were held at the Leeds Institute on February 21st. Mr. H. B. Booth, F.Z.S., M.B.O.U., the President of the Section, was in the Chair, and the meetings were both well attended. The Chairman referred to the death in South Georgia of Major Barrett-Hamilton, where he had been sent by the Government to study and report upon the whale industry. Such an event was at any time to be deplored, but the loss was particularly serious owing to the unfinished state of his monumental work on "British Mammals" It was a sad coincidence that both he and Dr. Wilson who was illustrating the work, should be lost in the Antarctic.

Mr. Riley Fortune, F.Z.S., reported on the steps taken by the Protection Acts Committee for 1914 in appointing watchers, etc. Dr. E. S. Steward, M.B.O.U., gave a remarkably interesting account of an ornithological holiday spent chiefly among the larger Raptorial Birds in the Spanish Sierras. Especially noteworthy were the large numbers of vultures, eagles and kites to be seen in quite a small area, and the arboreal nesting habits of species usually credited as cliff and mountain breeders. Many further interesting details were given of lowland species met with, *i.e.*, Stone-curlew, Woodlark, Great Spotted Cuckoo, and its host, the Magpie, etc.

Mr. Johnson Wilkinson attended the meeting to bring before the members' notice the 'Plumage Bill,' shortly to be introduced in the House of Commons. Lines of action in furtherance of the measure were suggested, and it was decided that the Union's Secretary should solicit the support of all the Yorkshire M.P.'s and that each individual member of the Section should do the same with his Parliamentary representative. It may be remembered that it was through the efforts of Yorkshire Naturalists and a Yorkshire M.P., Mr. Christopher Sykes, that the 'Sea-birds' Preservation Act, 1869,' put a stop to the slaughter, in breeding time, of British Sea-birds for the decoration of millinery.

Mr. W. H. Parkin raised the question of a report of Professor Garstang's lectures on Yorkshire Birds, as to whether the Whooper Swan had bred in Harewood Park. Mr. Fortune pointed out that on two occasions the pinioned birds had bred there. Mr. E. W. Wade commented on the unusually severe weather experienced on the Continent and the resultant immigration of Waxwings, also on the abnormal eruptions of Woodcock on the East Coast.

Mr. G. H. Parkin exhibited a collection of seeds taken from the crops of Pallas' Sand-Grouse imported in the frozen state into this country. The weight of the bird averages 9½ ozs., and the crop (which was full) contained one ounce of various seeds. He had been able to separate sixteen varieties and many of these he had been successful in growing for herbarium specimens. These were handed round.

He also showed a beautifully set up Waxwing from Bourne, Lincolnshire, which had its crop full of rose hips.

Mr. W. J. Clarke, F.Z.S., exhibited a skin of a starling shot near Scarborough on the 1st January, 1914, and was found to have been ringed at Lisden, near Walmar, Livland, in June, 1912.

He also brought forward a 'Pearl-side' (*Scopelus pennanti*) measuring 1⅝ inches in length, preserved in spirit, taken in Scarborough South Bay, February 19th, 1914. The Scopeli are nocturnal in habits and are generally diffused throughout the Ocean both in Northern and Southern Hemispheres. Many species are found in the Mediterranean and in the Chinese, Indian, and Australian Seas.

S. Pennanti has occurred several times at Redcar, at Portobello, in the Orkneys, at Downing in Flintshire and at Exmouth.

Mr. Rosse Butterfield exhibited an unusual variety of the Snipe, procured in Ireland.

Mr. Fortune proposed a new member to the Union :—Rev. W. Pearson, Spofforth Rectory. Mr. W. H. Parkin gave a short paper on the 'Cuckoo,' supplementary to the former discussion on its parasitical breeding habits.

Mr. E. W. Wade and Mr. E. W. Taylor gave two papers, illustrated by lantern slides, on 'Further notes on the Stone Curlew,' and 'The Home-life of the Merlin,' respectively, which appear on other pages.

Professor W. Garstang, with the aid of numerous diagrams and other slides, gave a lucid summary of the work done by the International Commission appointed to enquire and report on the North Sea Fisheries. Many hitherto unknown features and stages in the life-history of the Plaice, Herring, Eel, Cod, Haddock, and Mackerel were determined; such as the annual migrations, the influence of temperature, sunshine, salinity, etc., on the productivity and status of the various species.

Mr. H. B. Booth brought for comparison skins of British and Continental forms of the Jay; Marsh, Coal and Great Tits; Robin, and Bullfinch, with explanatory details of the variations classified by Dr. Hartert. The members were indebted to the Hon. Walter Rothschild, of Tring, for the loan of these, and to Dr. Hartert, through whose kindness they were exhibited.

Vote of thanks to the lecturers and to Mr. Graham of the Leeds Education Office, for the use of the room was heartily carried.

A. Haigh Lumby.

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YORKSHIRE BRYOLOGISTS AT PLUMPTON.

The Bryological Section of the Yorkshire Naturalists Union had a profitable excursion, under the guidance of Mr. R. Barnes, to Plumpton Rocks on Saturday, 21st March.

On the walls at the entrance to the park he pointed out *Hypnum hispidulum* var. *Sommerfeltii*—a moss quite new to most of the members—and also one or two of the smaller hepatics which will require more careful inspection before naming definitely.

The Rocks proved of peculiar interest. Here was found an association of mosses which could not be correlated by any of the members with a similar gathering-ground. The species found dominating the rock-surfaces are generally sought for most carefully and found in small patches, the most striking being sheets of *Orthodontium gracile*—one of the rarest mosses in the kingdom—the usual thing being an abundance of *Dicranella heteromalla*, but here this was absent, or at least only sparsely represented. Occasionally its var. *Serecia* was seen.

A more frequent moss, and one that might be expected, was *Campylopus flexuosus*. The third in importance, *Cynodontium Bruntoni*, seemed partial to parts of the rocks more exposed to westerly winds and in the large crevices between the rock masses. *Tetraplis pellucida* practically completed the moss list on the rocks, with one or two hepatics, *Lophozia ventricosa*, *L. gracilis*, *Lepidozia reptans*, and *Sphenolobus exsectæformis*.

On the sandy soil *Pleuridium subulatum* was seen, and in other situations *Webera nutans*, *Bryum capillare*, and *Tortula ruralis*.

The feature of the place is the great amount of *Orthodontium gracile*. To those who know how little can be found in its best-known habitat at Bolton Woods it was a source of amazement, and in a county so well worked as our own its abundance was scarcely credible. It has been found at Birk Crag in small quantity by Mr. L. Cocks, but this and Bolton were our only records.—C. A. Cheetham.

Naturalist,

NEWS FROM THE MAGAZINES.

Professor J. W. Carr gives a list of 'The Psocidæ of Nottinghamshire,' in *The Entomologist*, for March.

Mr. E. Wooler contributes a paper on the Roman Station of Lavatræ (Bowes) in Part 88 of the *Yorkshire Archæological Society's Journal*.

Professor Roberts Beaumont of the Leeds University, has an interesting paper on 'The Organization of a Textile Museum,' in the February number of *The Museums Journal*.

There is a paper on Pteridosperm Anatomy and its relations to that of the Cycads, by N. Bancroft, in *The New Phytologist*, Vol, XIII., Nos. 1-2, for January and February, 1914.

In *The Zoologist* for February, Mr. H. V. Jones writes on 'Parasitism in Relation to Birds," and Mr. F. J. Stubbs, has a paper on 'Corophium longicorne: An ornithological Study of a Crustacean."

In the *Journal of the Board of Agriculture and Fisheries* for February, there is an interesting paper on 'The Pollination and Fertilization of Hops; and the Characteristics of "Seeded" and "Seedless" Hops,' by E. S. Salmon.

La Feuille des Jeunes Naturalistes for March contains a paper on 'Applications Nouvelles de la Radiographie a l'histoire Naturelle,' by M. Pierre Goby, and is illustrated by plates showing radiograph photographs of Sea Urchins, Beetles, Reptiles, Moths, Diatoms, Foraminifera, etc.

In the *Entomologist's Monthly Magazine* for January is a note recording the abundance of *Pterostichus parumpunctatus* Germ. in the Newcastle district, and there is also a lengthy report of the meeting of the Entomological Section of the Yorkshire Naturalists' Union in Leeds in October last, by Mr. G. T. Porritt.

The Journal of the Manchester Geographical Society, Volume 29, Parts 1 and 2, for 1913, published February 1914, contains papers on 'Education,' by Sir Harry H. Johnston; 'British East Africa Protectorate'; "The Balkans and Turkey,' by C. H. Bellamy; 'Highways and Byways in the Balkans,' by Gilbert Waterhouse.

In the *Entomologist's Record*, Volume XXV., No. 12, attention is drawn to a recent remarkable sample of rubbish in one of the English illustrated papers. There are four illustrations, headed "Fierce Battles of the Insect World.' (1) *Mantis religiosa* L., fighting with grasshopper *Platycleis grisea*, Fab. This is entitled 'Rearhorse or mantis versus grasshopper.' (2) *Cicada* emerging from nymph. This illustration is entitled 'Giant Fly attacking a Bee.' (3) Two mantids fighting, entitled 'Hand to hand encounter between two rear horses.' (4) Evidently the same two insects as the last, but styled 'Winged ant grips rear horse across the body.'

The Journal of the East Africa and Uganda Natural History Society, No. 4, No. 7 (92 pp.) has been published and can be obtained from Messrs. Longmans, Greens and Co., for 5s. 4d. Among the contents are 'The Relation of Game Animals to Disease in Africa,' by R. B. Woosnam; 'The Organic Cell,' by Dr. E. Wynstone-Waters; 'The Tribes of the Tana Valley,' by Miss A. Werner; 'Scientific Classification of E. African Sea Fishes,' by R. J. Cunninghame; 'List of Butterflies from British East Africa,' by Rev. K. St. A. Rogers (reprinted from an English Entomological Magazine). There are several shorter notes and illustrations, including a fine coloured plate of *Ploceus interscapularis* ♂ and *Yellow-Mantles Weaver* ♀.

NORTHERN NEWS.

No. 7, Volume X. of *Records of the Australian Museum* is devoted to an account of the Status of *Chelonia depressa* Garman, by Dene B. Fry.

The fifth Report of the *Bardney Abbey Excavations* is to hand, and shows that a good year's work has been done.

According to the daily press the Starfish *Luidia* produces over two hundred million eggs. We demand a recount.

Mr. E. R. Matthews, F.G.S., the Borough Engineer of Bridlington, has been appointed Professor of Municipal Engineering at the University of London.

The Lincoln Museum has issued a Guide to the Collection of English Porcelain lent by Mr. E. W. Kirk. It is written by the Rev. H. W. Hall, and is sold at one penny.

Captain S. S. Flower sends us his recent report on the *Giza Zoological Gardens*, Cairo (Publication No. 25), which is sold at a shilling. It contains some interesting views in the gardens and their contents.

At a recent meeting of the Todmorden Town Council it was decided to establish refreshment rooms and a museum in the large mansion at Centre Vale Park, inquiries having been made as to the loan of suitable exhibits for the latter.

We have received the valuable *Records of Meteorological Observations* taken at the Observatory, Edgbaston, 1913, by the Curator, Mr. A. Cresswell. It is published by the Birmingham and Midland Institute Scientific Society, at two shillings.

Mr. H. Crowther, of the Leeds Museum, has been giving a series of lectures with one particular object, namely, 'to make the people of Leeds understand that in their midst was one of the finest collections of objects in England, outside London.'

An interesting account of Carlisle, by Adelaide Curtiss, appears in *Records of the Past* for January-February 1914. We notice this part is 'Whole Series, Volume XIII., Second Series, Volume I., Part 1.' This second Volume I., Part 1, within a comparatively few years of the first, will doubless cause confusion in the future.

In his presidential address to the *Manchester Geological and Mining Society*, published in Volume 33, part 9, of its Transactions, Sir Thomas Holland makes some rather scathing remarks in reference to the results of the work of students at the Birmingham University; particularly with reference to such degrees as 'B.Sc., Petroleum Mining.'

At the Annual Meeting of the British Ornithologists' Union on 18th March the principle of the Plumage Bill was approved subject to better provision being made for the importation of skins for scientific purposes. A proposal that ladies should be eligible for election as ordinary members of the British Ornithologists' Union was negatived by a large majority, as it was considered unwise to allow them to have any say or vote as ordinary members. The Union has Honorary Lady Members.

We have received from Mr. T. Petch, B.A., B.Sc., a Yorkshire Naturalist now in Ceylon a batch of papers giving every evidence of his zeal in his present sphere of work. Among them are 'Papers and Records Relating to Ceylon Mycology and Plant Pathology, 1783-1910,' 'Termite Fungi: A Resume,' 'The Black Termite of Ceylon,' 'an Orchid New to Ceylon,' 'Notes on the Brazil Nut Tree in Ceylon,' all reprinted from *The Annals of the Royal Botanic Gardens*, Peradeniya, Volume V., part 5 and 6; and 'Diseases and Pests Legislation in Ceylon,' Bulletin No. 6 of the Department of Agriculture, Ceylon.

HELIX NEMORALIS L.

Helix nemoralis Linné.
Truro, J. H. James.

H. nemoralis v. *rubella* Picard.
Valentia Island, E. Collier.

H. nemoralis v. *rubra* Baudon.
Lisdoonvarna Spa, E. Collier.

H. nemoralis v. *rosea* Baudon.
Knottingley, J. Cordukes.

H. nemoralis v. *libellula* Risso.
Valentia. E. Collier.

H. nemoralis s.v. *albescens* Pic.
Ballyvaughan, E. Collier.

H. nemoralis v. *flavovirescens* Pic.
Bristol, Miss Hele.

H. nemoralis v. *studeria* Moq.
Castleton, G. H. Taylor.

H. nemoralis v. *olivacea* Risso.
Limerick. E. Collier.

H. nemoralis v. *castanea* Picard.
Blagdon, Miss Hele.

H. nemoralis v. *citrinozonata* Ckll.
Carrickfin, E. Collier.

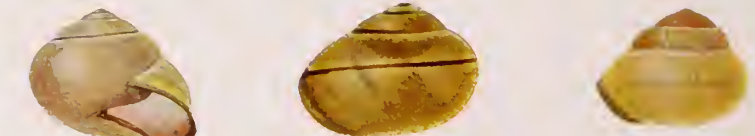
H. nemoralis v. *hyalozonata* Taylor.
Carrickfin, E. Collier.

H. nemoralis v. *lateritia* D. & M.
Blagdon, Miss Hele.

H. nemoralis v. *fascialba* Picard.
Barnsley, W. E. Brady.

H. nemoralis s.v. *mista* B. & B.
Hereford, Dr. Boycott.

H. nemoralis v. *olivaceozonata* Coll.
Magilligan, E. Collier.



H. nemoralis v. *roscolabiata* Kob.
Bath, Miss Hele.

H. nemoralis s.v. *tenuis* Baudon.
Ennistimon, P. H. Grierson.

H. nemoralis v. *rubello-libellula* Ckll.
Bordeaux, K. F. Scharff.

J. W. Taylor, del. ad nat.

NOTES AND COMMENTS.

MUSEUM EXHIBITS.

The *American Museum Journal* for January contains an illustrated article by Dr. F. A. Lucas, in which he points out that the late E. T. Booth, whose well-known collection of British Birds is now the property of the Corporation of Brighton, has the best claim to be the founder of the plan of exhibiting in museums, groups of animals mounted amid artificial imitations of their natural surroundings. He was followed by Mr. Montague Brown, then curator of the Leicester Museum, and soon after by the lafe Dr. R. B. Sharpe, in the Natural History Branch of the British Museum, where a group of coots formed the commencement of the splendid series of exhibits which is now the delight of the visitors to the bird gallery. The rise and progress of the practice—especially in America—are fully described in the article, of which a continuation is promised.

ACTION OF LIGHT ON CHLOROPHYLL.

At a recent meeting of the Royal Society, Mr. Harold Wager, F.R.S., read a paper on the action of light on chloro phyll. When chlorophyll is decomposed by light, at least two distinct substances are formed, one of which is an aldehyde or mixture of aldehydes, and the other an active oxidising agent capable of bringing about the liberation of iodine from potassium iodide. The decomposition of chlorophyll appears to be due directly to the action of light, and is not an after effect of the photo-synthesis of carbon dioxide and water. It takes place only in the presence of oxygen, and it appears to be a case of photo-oxidation. for oxygen is used up so completely in the process that chlorophyll can be used instead of pyrogallol and caustic potash to determine the amount of oxygen in a given amount of air. In the absence of oxygen no bleaching takes place. Carbon dioxide is not necessary to the photodecomposition of chlorophyll and is not used up in the process even when present in considerable quantities.

THE NESTS OF PSEUDOSCORPIONES.

At a meeting of the Zoological Society recently, Mr. H. Wallis Kew read an interesting paper on the nests of Pseudoscorpiones with historical notes on the spinning-organs and observations on the building and spinning of the nests. The paper described the nests in which these animals enclose themselves for moulting. for brood purposes, and in some cases for hibernation. They are closed cells of spun tissue, with or without a covering of earthy or vegetable matters. The tissue is of innumerable threads crossed and coalesced irregularly, without interspaces, and almost like silk-paper. With regard to the spinning-apparatus, confusion has existed ;

but the author's observations on living animals place it beyond doubt that the cephalothoracic glands are the organs concerned. Contrary to previous statements, the 'combs' of the cheliceræ have nothing to do with the silk. The manner in which the nests are built and spun was described in detail.

NOMENCLATURE AGAIN.

In the *Entomologist's Monthly Magazine* for April, Mr. E. A. Newbury writes on *Scopæus rubidus* of British Collections. He states that the species stood as *S. ryei*, Woll., in our catalogues down to 1883. In 1888, Fowler (Col. Brit., vol. ii., 311) gives the synonymy as :—'*S. rubidus* (*subcylindricus*, Scriba ; *ryei*, Woll.),' presumably having copied the European Catalogue of 1883, which work, strange to say, omits *S. minimus*, Er., altogether. In the last European catalogue (1906), *S. ryei* is given as a synonym of *minutus*, Er. As long ago as 1873, Rye (Ent. Mo. Mag., x. 138) states that 'S. *rubidus* Muls., is at all events quite distinct from *S. ryei*, Woll.' Captain Deville compared the specimens with several *S. minimus* Er., from France and opined that they were identical. The synonymy therefore appears to be *Scopaeus minimus* Er., *ryei* Woll., *rubidus* Brit. Cat., nec Rey ! !

MORE SYNONYMY.

On the same page, Mr. G. C. Champion states that he has long been suspicious that *Aradus lawsoni* Saund., described in 1877 from a single specimen caught near Scarborough, was not British. He communicated with Dr. Bergroth who writes 'Saunders's description and good coloured figure of *A. lawsoni* agree perfectly well with Finnish specimens of *A. truncatus*, Fieb. There can be no doubt that the two insects are synonymous, and this is also the opinion of Professor Sahlberg and Dr. Poppius. *A. truncatus* occurs in Germany and four or five places in France, as well as in Finland, but it has not yet been found in Sweden or Norway. It appears to be very rare everywhere.'

STILL MORE MIXES.

Mr. Claude Morley, in the very next note writes, '*Synonymy of Neoneurus halidaii Marsh., with Elasmosoma berolinense, Ruthe.* Hardly was my note on the former of the above names published (Ent. Mo. Mag., 1914, pl. 6), before I discovered Ruthe's species to be identical with that of Marshall, a female which I believe to be the type specimen of the latter, having been found in his collection in the British Museum. This ignorance on the part of the British Hymenopterists is entirely accounted for by the incorrect position assigned to the genus *Elasmosoma* by the Continental authors, accentuated by the supposed ignorance of the Rev. T. A. Marshall in 1888 (Bracon. d'Europ. ii., 551), and the immature condition of the

Yours truly,
Clive Barnett Hamilton

venation in this type—well shown in the figure (Berl. Ent. Zeitschr, 1858 pl. iii., fig. 2) which, so far from possessing Thomson's "Framvingarnes cubitus utgar straxt ofvan midten af vena basalis, areolan är nästan fyrkantig" (Opusc. Ent. xx., 1895, p. 2276), shows little of the former and nothing whatever of the latter feature.'

ZEBRAS.

That the entomologists are not the only sinners in the way of nomenclature is shown by the following remarkable instance, taken from 'Nature,' of the needless multiplication of technical names in zoology, that has recently occurred in the case of Grévy's zebra. Some years ago, Mr. R. I. Pocock pointed out that this species was so markedly distinct from other Equidæ as to be worthy of subgeneric separation, although he did not suggest a new subgeneric title. In 1912 Dr. Max Hilzheimer (Abh. Senckenberg Ges., vol. xxi., p.85), proposed for this species the subgeneric name, *Megacephalon*, which is pre-occupied (1846) by a well-known genus of birds. In the same year, Mr. N. Heller (Smithsonian Misc. Collect., vol. lx., No. 8, p. 1), apparently without knowledge of Dr. Hilzheimer's work, proposed the name *Dolichoppus* in a generic sense. Unaware of this, Dr. A. Griffini, in an article on zebras and quaggas, originally published in vol. iv. of *Natura* (Padua), but of which separately paged reprints have just reached this country, suggests the name, *Ludolphozecora* (from '*Zecora*,' the designation by which Ludolphus alluded to the species) to replace the pre-occupied *Megacephalon*.

BRITISH MAMMALS.

A melancholy interest attaches to Part 15 of the History of British Mammals, which has just been received from Messrs. Gurney and Jackson, inasmuch as the editor, Major Barrett-Hamilton, and the artist, Dr. E. A. Wilson, have both perished in the Antarctic while carrying out scientific research in the interests of their native country. The services of Mr. A. C. Hinton have been secured to continue the work, and doubtless it will not seriously suffer from these severe losses. The present part, in addition to containing an excellent portrait of Major Barrett-Hamilton with an appreciation by Mr. Oldfield Thomas, deals with the Bank Mouse, the Scoma Bank Mouse, and various other species of these small, but nevertheless very puzzling mammalia. There is an excellent coloured plate showing skins of *Arvicola amphibia amphibia*; *A. a. reta*; *Evotomys glareolus*; *E. skomerensis*, as well as numerous other illustrations. We are kindly permitted to reproduce the block of Major Barrett-Hamilton (plate XII.)

BLAKENEY POINT.

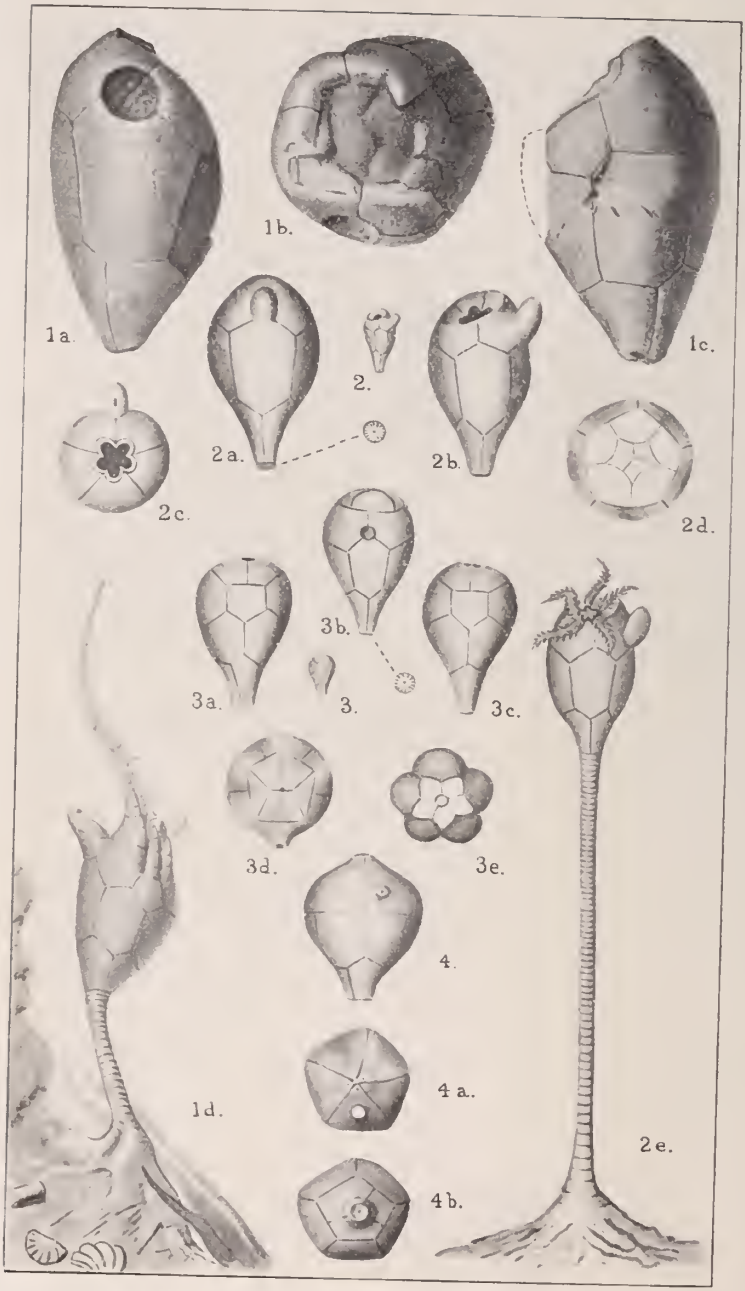
The National Trust has issued an interesting report on Blakeney Point in 1913, which deals with the work of the Committee of Management and of the Laboratory. There are valuable notes in reference to the local protection of bird life, vegetation, mammals, etc. In many ways Blakeney Point seems to resemble Spurn, and the view of the Terns' Breeding

Laboratory at Blakeney Point.

Ground, which we are permitted to reproduce, might very well stand for a photograph of Spurn Head.

HYPOCRINUS.

In the *Proceedings of the Zoological Society* Dr. F. A. Bather has recently published an interesting note on 'The Fossil Crinoids referred to *Hypocrinus* Beyrich.' These are based on a Crinoid Cup from the Carboniferous Rocks of Yorkshire, elsewhere described as *Sycocrinus parvulus*, though certain features suggested a comparison with *Hypocrinus schneideri*. The two specimens of *Hypocrinus schneideri* Beyr. described by Beyrich and Rothpletz respectively, are redescribed and refigured. The structure of the genus is shown to agree with that of the Devonian family *Gasterocomidæ*, but it is suggested that in this case and in that of '*Lecythiocrinus*' *adamsi* the distinctive features may have been independently acquired. The holotype of '*Hypocrinus*' *piriformis* Rothpletz is redescribed and refigured, and proved to be no *Hypocrinus*. It is thought to be a highly modified descendant of the Taxocrinidae, by way of such a genus as *Cydonocrinus*. The left posterior radial appears to have borne a large arm, but the



Sycocrinus.

other arms were more or less atrophied, and the right posterior radial has almost disappeared.

SYCOCRINUS.

In volume 13 of the Annals and Magazine of Natural History, Dr. Bather figures and describes *Sycocrinus anapeptamenus*, *S. clausus* and *S. jacksoni*, all three from the Viséan *Dibunophyllum* zone, of Settle, Yorkshire. These are illustrated on the accompanying plate (plate XIII.), which has kindly been lent to us upon which Fig. 1. shows the various aspects of *S. anapeptamenus*, 1*d* being an imaginary reconstruction of the animal. Fig 2 shows the various aspects of the same species as drawn by Austin, 2e being that author's reconstruction. Fig. 3 illustrates various aspects of *S. clausus* and Fig. 4 of *S. jacksoni*.

LAND AND FRESHWATER MOLLUSCA.

Part 20 of Mr. John W. Taylor's Monograph has recently appeared, and is principally devoted to descriptions of the

H. arbustorum monstr. *scalare* Fér. *H. arbustorum* sub-var. *subscalare.*

anatomy, distribution, etc., of *Helicogona arbustorum*. This occupies no fewer than 30 pages, in which many varieties and sub-varieties are illustrated and described, and there are also some charming coloured plates. We are permitted to reproduce illustrations of *H. arbustorum* monstr. *scalare* Fér., and *H. arbustorum* sub-variety *subscalare*, from Cheshire and Derbyshire respectively. With this part Mr. Taylor has issued, as an appendix, several pages containing additional information in reference to the Zonitidæ and Helicidæ acquired since the publication of the various parts composing the present volume, as well as a complete description of *Vitrina hibernica*—an addition to the British fauna and to science—a species only detected subsequently to the issue of the part dealing with the Vitrinæ. Mr. Taylor courteously enables us to reproduce one of the plates (plate XIV.).

YORKSHIRE AMMONITES.

Part XIII. of Mr. S. S. Buckman's monograph on " Yorkshire Type Ammonites ' has just made its appearance, and includes the usual number of excellent illustrations of these fossils. The present part contains nine plates upon which

the figures are *A. hyperbolicus*, *A. subtensis*, *Æg. finitimum*, *A. neglectus*, and *A. hastatus*. We are permitted to reproduce the illustration of *Æg. finitimum*, which may be taken as a fair example of the illustrations. Perhaps the most remarkable ammonite is *hyperbolicus* from the Kellaways Rock of Red

Æg. finitimum **from Robin Hood's Bay.**

Cliff, Scarborough. Mr. Buckman is to be congratulated on the progress he is making with this work.

ROCKALL

At a recent meeting of the London Geological Society, Professor J. W. Judd, C.B., F.R.S., gave the following general account of the geology of Rockall. Rockall is a small isolated rock in mid-Atlantic, lying 184 miles west of St. Kilda; it has a circumference of only 100 yards and a height of 70 feet, and, except in the very calmest weather, is quite inaccessible. It is the haunt of sea-birds and, with its whitened top, resembles a sailing ship, for which it has often been mistaken. The rock rises from a bank (the 'Rockall Bank') upon which there are several dangerous reefs. More than 300 years ago it was reported that a large island occupied the site of Rockall, and for a hundred years or more, all Atlantic charts represented this island, which was named 'Busse Island,' with a number of other islands and islets, as present in the North Atlantic. Taking these supposed facts in connection with the famous classical stories of an 'Atlantis,' the theory was often advanced that the North Atlantic was an area of subsidence, and that the reported islands—and, in the end, Rockall—were the last vestiges of the famous vanished continent. Modern research has, however, quite disposed of this theory.

AND ITS GEOLOGICAL STRUCTURE.

Nevertheless, Rockall is of considerable interest, especially

to geologists. In 1810 Basil Hall, then a young officer in H.M.S. *Endymion*, obtained a fragment from this rock, which later found its way into the collection of the Geological Society. More than thirty years afterwards, the specimen was recognized; it was then mislaid for another 30 years, and in 1895 was brought to me by the late Professor T. Rupert Jones. He not only carefully studied all the literature connected with Rockall, but was able to trace two other specimens of the rock, the loan of which he obtained and brought to me. They had been procured by two of the officers of H.M.S. *Porcupine* in 1868 during the survey of the North Atlantic. The microscopic study of these specimens shows that in Rockall there exist rocks of exceptional interest, which are not represented in our islands, but have analogues in the Christiania district of Norway, where they have been so well studied by Professor W. C. Brögger. These rocks, as shown by microscopic study and a chemical analysis made by Mr. Makins, consist essentially of three minerals—quartz, the felspar albite, and the rare soda-pyroxene ægirite, with its dimorphous form acmite. The rock, therefore, resembles the soda-granite and the grorudite of Professor Brögger—but, in deference to the opinion of the distinguished Norwegian petrographer, a distinct name was given to it. In 1896 an attempt was made to obtain further specimens of the rocks of this islet by members of the Royal Irish Academy; but, although many valuable observations were recorded, it was found, after two voyages had been made to Rockall, quite impossible to land and obtain specimens.

DESTRUCTION OF GREY SEALS.

A Standing Committeee of the House of Commons recently considered a Bill for the protection of grey seals. There was no amendment, and no opposition from any quarter. Mr. Lyell said the Bill proposed to enact for the next five years a statutory close time (between October 1 and December 15) during the breeding season. The grey seal was quite distinct from the common seal, from which it differed both in its habits and its time of breeding, and especially in the fact that the young were not able to swim for the first fortnight or three weeks. As a consequence, all the breeding-places had to be well above high-water mark, on lonely rocks and skerries, where they were especially exposed to attack. It was estimated by a competent authority that the total number of grey seals had been reduced in Scottish waters to less than 500; in Irish waters there were far fewer, and in English waters fewer still. In view of these facts some such measure would appear to be necessary to save an interesting animal from extinction. The Bill was agreed to as it stood.

TEETH OF *DIPLOPODIA (PSEUDODIADEMA) VERSIPORA.*

T. SHEPPARD, F.G.S.

THE accompanying illustration is from an enlarged photograph of a typical example of *Diplopodia versipora*, and enables us to show for probably the first time, the character of the teeth of the animal, which are still in position in the centre of the fossil.

Diplopodia versipora. $\frac{2}{1}$.

In the early number of the Palæontographical Society's 'Monographs,' illustrations are given of a few examples of echinoderm teeth, but they do not appear to be any relation to this particular genus.

An examination of a modern echinoderm such as can be obtained at most of our seaside resorts, shows the 'Aristotle's lantern,' as the mouth organs are called, just within the cavity on the underside of the test. It seems remarkable that in the thousands of fossil echinoderms from the Yorkshire Oolites, so very few should show any trace whatever of this important part of the animal, especially as the teeth appear to be quite as hard and firm as the test. Possibly the large size of the mouth opening, together with the fact that in most instances the dead shell would be washed about on the sea floor, accounts for the matter. The present specimen was found by Mr. H. C. Drake, F.G.S., in the well-known Coral Rag Quarry at Seamer. It was quite loose on a flat shelf of rock, from which it had apparently weathered, and the teeth were almost as clearly shown as represented in the photograph. The full complement of five is well seen, and each tooth is ribbed from the base towards the apex. Probably the specimen had been for some time on the ledge, as not only is the inside of the test clean, but the fossil is almost entirely freed from its matrix. Adhering to the top of the test is a portion of an oyster (*A. gregaria*) which almost entirely covers the anal orifice. The test measures $1\frac{1}{\frac{1}{2}}$ inches across, and is therefore about half the size of the illustration. Through the kindness of Mr. Drake the specimen has been placed with numerous other interesting Yorkshire geological specimens which he has given to the museum at Hull.

RECENTLY DISCOVERED FUNGI IN YORKSHIRE—VII.

C. CROSSLAND,
Halifax.

THE present is the seventh supplementary list of newly discovered Fungi in Yorkshire, since the issue of the Yorkshire Fungus Flora. It consists of 55 species, bringing the total known county fungus flora at the end of the year 1913 to 3,002. Of the 55 additions, six are new to Britain and one to England ; four of the former being met with in the Mulgrave district where were also 26 of the other additions. No species new to science were met with last year. The one new to England was found on the moors between Keighley and Cowling. Many have been already recorded in *The Naturalist*, January, 1914, pp. 15-16, and other places. The numbers in brackets following each specific name denote their sequence in the Flora.

NEW TO BRITAIN.

NAUCORIA WEISLANDRI Fr. [To follow 500].

N.E.—On the ground among short grass. Mulgrave Woods. F.F. Sep. 1913. 'Nat.' 1914, p. 15.

'*Pileus expanded, obtuse, glabrous, tawny, cuticle cracked into areolae, hence the surface is crowded with minute dark, wart-like papillae ; gills adnate, broad, dark rust ; stem filiform, almost naked, blackish.*'—'Mass. Eur. Agaricaceæ,' p. 167.

GALERA FLEXIPES, Karst. [To follow 504].

N.E.—Among grass in open place. Mulgrave Woods. F.F. Sep. 1913. 'Nat.' 1914, p. 15.

'*Pileus campanulate, obtuse, rusty and slightly pellucidly striate, ochraceous when dry ; gills adnexed, crowded, pallid, then rusty, edge crenulate ; stem equal, fistulose, wavy, pallid, white-fibrillose, apex white-primrose ; spores*, 10-12 × 5-6μ.'—'Mass. Eur. Agar.' p. 169.

PENIOPHORA GLEBULOSA. [To precede 1179].

N.E.—On decaying decorticated wood. Mulgrave. May, 1913. Certe. E. M. Wakefield.

PLEOSPORA EUONYMI, Fckl. [To follow 1651].

'*Gregarious, seated on pale spots as large as those of Pleospora herbarum, covered by the epidermis, round and depressed, mouth papilliform, black. Asci broad, cylindrical or oblong-cylindrical with short pedicel*, 120-125 × 26μ ; *spores* 8, *biseriate, oblong, broadest above the centre, constricted, ends rounded, septa 7 transverse, and 2 imperfectly longitudinal, golden yellow*, 26-28 × 10-12μ.—(Trans. from Winter).

N.E.—On fallen leaves of Euonymus sp., South Cliff, Scarborough, March, 1913. T. B. Roe.

1914 May 1.

Mollisia maculans, Rehm. Cke. Grev. IV., p. 41 t. 51, fig. 247 ; Sacc. Syll. VIII. p. 343, n. 1421 (= *Pseudopeziza maculans* (Rehm.) Boud. Discom. Eur. p. 133.

N.E.—On dead leaves of *Nardus stricta*, Silpho Moor, near Scarborough, July. T. B. Roe. [To follow 2017].

'*Sessilis, sparsa, primitus urceolata, margine vix albidulo, dein humida, explanata, subplano-patellaris, disco albido-cinereo, extus fuscidula, parenchymatico-contexta, sicca irregulariter rugulosa, plicata, fusco-nigra, c.* 0.3 *mm. diam.*; *ascis clavatis, apice subincrassatis,* 8 *spores,* 30-42 × 6-7*μ jodo apice coerulescentibus*; *sporidis obtuse ellipticis rectis v. subcurvatis,* 1-*cellularibus, hyalinis, distichis,* 9-11 × 2-3*μ paraphycibus filiformibus, apice haud clavatis nec tinctis.*'

Hab. ad culmos siccus *Nardus stricta.*

Gloeosporium trifolii, Peck. [To precede 2281].

N.E.—On *Trifolium repens*, near Sandsend, May 6th, 1913. Only previously known from U.S.A.

NEW TO ENGLAND.

Chondrioderma simplex Schroet (=*Diderma simplex*, Lister). [To precede 2537].

On dead prostrate ling near Hitchingstone, on the moors between Cowling and Keighley. Alt. about 1200 ft. Keighley Nat. Hist. Soc., July, 1913. F. White. Com. Thos. Hebden.

Hitherto found in Britain only at Aberdeen and in North Wales. Other stations recorded are Selisia ; near Berlin ; New Jersey ; Philadelphia ; South Chili.

NEW TO YORKSHIRE.

The following 26, all being from the Mulgrave District, the locality needs no repeating. The remainder of the additions from other parts of the county follow in due course.

Lepiota sistrata Fr. [To follow 76].

On the ground.

Clitocybe alutacea Cke. and Mass. [To follow 141].

Collybia butyracea var. bibulosa Mass.

On grassy, woodland ground.

Collybia stridula Fr. [To precede 180].

On the ground. Distinguished from *Tricholoma melaleucum* by the dark stem.

Omphalia infumata B. and Br. [To follow 281].

On rotting twigs among moss.

Pluteus nanus (Pers.) var. lutescens Fr.

On rotten wood.

Inocybe geophylla Fr. var. violacea Pat.

Among grass, woodland path side.

Hebeloma sinuosum Fr. [To precede 453].

Naucoria pusiola Fr. [To follow 484].

Cortinarius (Ino.) argentatus Kromb. [To precede 261].

Lactarius subdulcis, Fr. var. concavus Fr.

Russula fingibilis Britz. [To precede 858].

Among grass in the woods.

Corticium botryosum Bres. [To come near 1162].

See Trans. B.M.S. 1913, p. 117. E. M. Wakefield.

On soft rotten wood.

Peniophora longispora (Pat.) v. H. [To precede 1179].

On decaying decorticated wood. Miss E. M. Wakefield remarks on this ' A species which I have only had once before, from our (Kew) gardens, and which I recorded in the Kew Bulletin, No. 6, 1913, p. 197. A pure white species, well marked by its habit which is that of a Hypochnus (in Fries' sense) and its long slender spores, 12-17 × 2-2.5μ.'

Apyrenium lignatile. [To follow 1280].

On decaying pine wood. Supposed to be a stage of *Hypocrea rufa*.

Morchella elata Fr. [To follow 1721].

Helvella guepinioides Br. and Cke. [To follow 1730].

On naked ground.

Humaria maurilabra (Cke.) Sacc. [To follow 1809].

Very rank on a patch of burnt ground.

Humaria aspegrenii Fr., Summa Veg., p. 355 (= *Peziza Aspegrenii, Fries. Syst., Myc.*, II. p. 131). [To follow 1952].

On decaying chip. This find enabled Mr. Massee to extend the present somewhat meagre description.

Oospora candidula Sacc. [To precede 2299].

On damp rushbottom chair, Sandsend.

Verticillium buxi Aners. and Fleisch. [To follow 2347].

On dying leaves of box trees.

Ramularia nivea.

On leaves of *Caltha palustris*. [This and the three following to come between Nos. 2362 and 2365].

Ramularia pratensis Sacc.

On leaves of *Rumex acetosa*.

Ramularia plantaginea Sacc. and Berl.

On *Plantago lanceolata*.

Ramularia primulae Thum.

On leaves of *Primula vulgaris*.

Macrosporium brassicae Berk. [To be near 2427].

On rotting cabbage-stalk.

Amanita muscaria (Fr.) var. formosa Pers.

S.W.—Under birch trees along with the type. Goit Stock Woods, near Keighley, October. Thos. Hebden.

Pileus tawny orange, scales absent, stem elongated, canary colour.

Lepiota serena Fr. [To follow 79].

N.E.—Scarborough. A. E. Peck, October.

Naucoria arvalis Fr. [To follow 492].

S.W.—On mud, damside. Luddenden Dean, near Halifax. Hx. Sci. Soc., September.

Notable on account of its slightly swollen, long tapering, base of the stem.

Russula claroflava Grove. [To follow 883].

S.W.—Wade Wood, Luddenden Dean. Hx. Sci. Soc., September.

Differs from *R. ochroleuca* in the clear, deep chrome yellow pileus, cream to lemon yellow gills and darker grey, streaky stem.

Cantharellus replexus Fr. [To precede 911].

S.W.—Among short grass on limy road-scrapings, roadside, Cullingworth. Thos. Hebden, October.

Grandinia papillosa Fr. [To follow 1136].

On decaying branch, Stainer Wood, Selby, 1913. W.N.C. Certe. E. M. Wakefield.

Corticium subcoronatum, V. Holn. and Litsch. [To precede 1163].

N.E.—On rotting wood, Airyholme, near Great Ayton. Y.N.U. Exc. Aug., 1913. 'Nat.' September, p. 330.

'Resembles *C. botryosum* in habit and occurs much more commonly in similar situations. It differs in having well-developed clamp connections at every septum, and in the usually narrower spores, but possibly is only a form of that species.' (E. M. Wakefield, Brit. Myc. Soc. Trans., Vol. IV. Part 3, p. 118).

Peniophora laevigata (Fr.) Mass. [To follow 1179].

S.W.—On bark of conifer, Roche Abbey Valley. Y.N.U. Exc. March, 1913. 'Nat.' May, p. 208. Certe. E.M.W.

Melampsora æcidioides (D.C.) *Uredospores.*

N.E.—On leaves of young *Populus canescens* arising from suckers. Easby, Y.N.U., Great Ayton Exc., Aug., 1913. 'Nat.' September, p. 329. [To precede 1289].

Uredo troplœi Desm. [To precede 1396].

S.W.—On leaves of Nasturtium from Mr. A. Clarke's garden, Huddersfield, September. The first record of the notice of this parasite on Nasturtium in Yorkshire.

Puccinia Zopfi. Wint. in Hedw, 1880, pp. 39 and 107.

'This species differs from the closely related *Puccinia Calthae* Link. in having teleutospores with warted epispore; the margin of the pseudoperidium is slightly incised forming 4-5 broad lacineae.

'On Caltha palustris . . . from Antrim, determined by W. B. Grove in *Irish Naturalist*, XXI., page 112, 1912.

'In the Herbarium at the British Museum there are specmens of this Puccinia from Yorkshire, North Wales and Scotland.' Trans. Brit. Myc. Soc. Vol. IV., Part 1., page 185.

Mr. J. Ramsbottom of the Brit. Mus. (Nat. Hist.) informs me that the Yorkshire specimen of P. Zopfi is in the W. W. Strickland herbarium labelled *Puccinia Calthae*, Marsh, near Lady Edith's Drive, Scarborough, Aug. 15, 1880. [To follow 1318].

GNOMONIA HERBICOLA, A. L. Smith. Trans. B.M.S., 1909, p. 221. Mr. Gibbs first found the fungus at Wirksworth.

N.E.—On living stems of *Epilobium hirsutum*. Y.N.U. Exc., Great Ayton, Aug., 1913. 'Nat.' September, p. 329. [To follow 1630].

HEPTAMERIA CLIVENSIS (B. and Br.), Sacc. [To follow 1644].

N.E.—On base of dead burdock stem, Great Ayton, Y.N.U., Exc., Aug., 1913. 'Nat.' September, p. 330.

PLEOSPORA HERBARUM var. SCROPHULARIA. (=*P. scrophularia*, Rabh.).

N.E.—On old capsules of *Rhinanthus cristagalli*, South Cliff, Scarborough, June. T. B. Roe.

LOPHODERMIUM RHODODENDRI Ces. [To precede 1709].

N.E.—On the underside of fallen leaves of *Rhododendron ponticum*, Raincliffe Wood, Scarborough, February. T. B. Roe (*See* 'Nat.' June, 1913, p. 218); Mulgrave Woods, May. 'Nat.' January, 1914, p. 15.

GEOPYXIS COOKEI Mass. Brit. Fung. Flo. IV., pp. 378-9. (=*Peziza radiculata*, Cooke, Grev. III., fig. 92). [To follow 1753].

On the ground in fir-plantation, Seamer, near Scarborough. A. E. Peck, October, 1913.

PHOMA ARAUCARIA Cke. [To come near 2230].

N.E.—On dead leaves of *Araucaria imbricata*, Fylingdale Hall gardens, June 18th, 1913. T. B. Roe.

This species was also found in Mulgrave Woods in September.

GEOTRICHUM CANDIDUM, Link. [To follow 2306].

N.E.—On damp paper, Museum, Scarborough, November. T. B. Roe.

STEMONITIS FUSCA, Roth. var. CONFLUENS, List. Myc. 2nd ed., p. 144.

S.W.—On decaying stump, Hathershelf Scout, Sowerby, near Halifax. H. Walsh, October.

DIANEMA HARVEYI, Rex., List. Myc. 2nd ed. p. 257.

Mid. W.—On dead ash branch, Trow Ghyll, Clapham. A. R. Sanderson, who remarks, 'Plasmodium watery and almost colourless. . . . I believe the plasmodium of this species has not previously been seen.' Mr. Sanderson further adds,

' It was found last December (1912) in Bolton Woods and specimens submitted to Miss Lister.

TRICHIA INCONSPICUA, Rost., Mass. Mon., p. 180 (*T. contorta* var. *inconspicua*, List. Myc. 2nd ed., p. 213).

S.W.—On rotting stump, Ramsden Wood, Halifax. H. Walsh. October.

TRICHIA VERRUCOSA, Berk. [To follow 2536].

S.W.—On dead wood, Cragg Vale, near Halifax. H. Walsh.

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Animal Life by the Sea-shore, by **G. A.** and **C. L. Boulenger**, 83 pp. London: Country Life, Ltd., 5s. net. Probably few persons are more

Spider Crab covered with weeds.

qualified to deal with this exceptionally interesting subject than the present authors, and we must congratulate them and the publishers on this little manual for the use of the amateur naturalist at the seaside. The work is by no means technical, and the wealth of illustrations, both from photographs and drawings, considerably adds to its value. In addition to the fishes, the volume deals with Ascidians, Molluscs, Crustaceans and other Arthropods, Worms, Starfishes and Urchins, Polyps, Jelly-Fishes and Sponges. By the use of unusually thick paper, almost resembling cardboard, the 83 pages in the book form quite a substantial volume. We are permitted to reproduce one of the illustrations herewith.

Naturalist,

A LARVA PLAGUE IN DEFFER WOOD, YORKS.

B. MORLEY,
Skelmanthorpe, Huddersfield.

For some years a few species of Spring-feeding larvæ have been so numerous in Deffer Wood, near Skelmanthorpe, that by mid-June they have completely eaten up all the foliage. The first defoliation took place in 1910, and since then it has yearly become more complete, but it is hoped that the plague has now ceased. Probably the shortage of food for the growing larvæ has had disastrous results not only on the species that caused the devastation, but especially on other species of tree-feeding lepidoptera that are seldom more than common.

During 1909, the year before the first swarm, my records of the appearances of the species that caused it are as follows :—

Phigalia pilosaria common.
Himera pennaria common.
Hybernia defoliaria common.
H. aurantiaria plentiful.
Oporabia dilutata abundant.
Cheimatobia boreata abundant.
C. brumata abundant.
Tortrix viridana abundant.

During the early summer of 1910 all the above species took about an equal share in the first defoliation, and as the food supply was consumed before all the larvæ pupated, it was apparent that a keen struggle for existence would take place.

Singularly enough, *Tortrix viridana* was the first species to fail. From great abundance in 1909 it fell to almost extinction by 1912. The rapid disappearance ot this species may be accounted for by the fact that the foliage of the oak was first eaten up, and the species being an oak feeder, its food supply failed before the larvæ completed their growth.

Cheimatobia boreata also quickly diminished in numbers. In 1912 it almost failed to appear in the perfect state—being strictly a birch feeder, the larvæ would perish if not full fed when the birch leaves had all been eaten up.

Oporabia dilutata gradually showed a reduction in numbers. It was abundant in the perfect state in the autumn of 1910, but it has appeared since in greatly reduced numbers. Last autumn (1913) it was scarce.

All the other species in 1912 were most abundant as larvæ with the exception of *Phigalia pilosaria*. In the early months of the year the emergence of this species showed a great falling off compared with the abundance of the previous year, and the resulting larvæ were not plentiful, and they apparently fared badly. In 1913 the emergence was a poor one, while during the present year the moth has been a rarity.

Himera pennaria was the next to fail. It was very abundant in the perfect state during the autumn of 1912, and the larvæ in the spring of 1913 swarmed, but curiously, in the

autumn, not a single specimen was seen. The mortality in the metamorphic stages must have been enormous. The two species of *Hybernia*, *defoliaria* and *aurantiaria*, appeared in the perfect state during the autumn of 1912 in vast numbers. Eighty females of *defoliaria* were counted one evening on one birch trunk. The moths swarmed everywhere. The resulting larvæ in the spring of 1913 were in such immense quantities that many of the trees were never allowed to come into leaf at all. The growth was eaten up as the buds expanded. The larvæ were reduced to such straits as to eat the moss off the tree trunks; grass, heather, and bracken were also eaten. The autumn proved that few survived. *H. defoliaria* was a rarity, and although *H. aurantiaria* was rather more numerous it was not by any means common. It was evident that over-production had paid its penalty.

To that pestiferous species *Cheimatobia brumata* must be given the credit for persistence, for whatever be the cause of the reduction in the numbers of all the other species, whether it be parasites, or insufficient food supply, or both, *brumata* has not suffered, the emergence late in 1913 was as abundant as ever.

Cidaria corylata was an abundant species six years ago, but now seems to have disappeared.

Cosmia paleacea. Became common five years ago, but has not been taken for three years.

Cleoceris viminalis. Four years ago larvæ were abundant on sallow. Not a single larvæ has been found for two years, and all the sallows have been completely stripped before the larvæ of *viminalis* could be a quarter grown.

Cabera pusaria and *Hylophila prasinana* are practically extinct.

Geometra papilionaria. Was formerly common; only one seen during the last three years.

Metrocampa margaritaria, *Orthosia suspecta*, *Drepana falcataria*, *Notodonta dictæoides*, *N. dromedarius*, *Lophopteryx camelina*, *Acronycta leporina* and others have all either disappeared or are very scarce.

Calymnia trapezina. Five years ago was abundant, now it is a scarce species in the wood, notwithstanding the great reputation the larva has for cannibalism; evidently a diet of caterpillars alone is not good for it.

The effect of these four years of defoliation has been disastrous to the trees. They have now a very stunted appearance, and owing to the growth being repeatedly arrested they have many dead twigs and boughs.

The wood is strictly preserved for game, consequently, with the exception of owls, which are numerous, birds of prey are scarce, therefore insectivorous birds are far from uncommon. The night-jar especially is plentiful.

Naturalist,

During the plague no increase in the number of birds has been noticed, except that during the last two swarms many rooks and starlings led their broods of fledglings to the wood and fed them upon the larvæ, of which they must have destroyed large numbers.

The only result of these deplorable devastations that has given any pleasure is that many fine varieties of some of the lepidoptera have been obtained.

Professor E. J. Garwood has been elected a Fellow of the Royal Society.

Lord Dudley has presented a number of Mammals and Reptiles to the Sunderland Museum.

Part 5 of Volume XII. of *The Records of the Past* is a valuable index to the twelve volumes of that Journal.

We regret to notice the death of Mrs. Huxley, widow of the Rt. Hon. Thomas Henry Huxley, whick took place at Eastbourne, on April 5th. Mrs. Huxley was in her 89th year.

We are glad to see that a Derbyshire Entomological Society has been formed. An inaugural meeting was held in March. The President is the Rev. R. C. Bindley (Vicar of Mickleover), the Treasurer Dr. St John, and the Secretary is Mr. G. Hanson Sale, of Littleover.

We have received a remarkable account of the geological features of the Culm of South Devon, Exeter District, by Messrs. F. G. Collins and G. C. Crick, from which it would appear that these beds are much more prolific in organic remains than has usually been thought.

The Rt. Hon. Lord Sudeley favours us with a copy of his address on the *Educational Value of Museums*, recently delivered to a large number of London School Teachers at the invitation of the London County Council. In the same pamphlet are several favourable press comments on the subject.

The members of the Vertebrate Section of the Yorkshire Naturalists' Union are congratulating themselves that one of their nominees for membership has recently tried his luck with the French champion boxer of the world. It is suggested that he might be of practical service in connection with the work of the Wild Birds and Eggs' Protection Committee.

The extensive collection of objects made from lead, together with numerous 'bygones,' etc., formed by Mr. James Backhouse of York, while visiting the various Yorkshire Lead Mines, has been added to the collections in the museum at Hull. Mr. Backhouse, who is the author of the chapter on Yorkshire Lead Mining in the Victoria History, etc., has made a special study of this subject, and his collection is one of exceptional value.

The Selby Educational Museum, which the late Sir Jonathan Hutchinson left to his trustees to dispose of in their absolute discretion, and was generously offered to the town by them, has been accepted by the Urban Authority, and terms have been settled under which the freehold of the property is acquired from Lord Londesborough. The property has hitherto been held on lease from the Lord of the Manor. The lease had yet to run some 27 years. The Museum buildings include the large hall used for public meetings.

FOSSIL FOOTPRINTS NEAR SCARBOROUGH.

J. A. HARGREAVES.

(PLATE XV.).

In *The Naturalist*, for February, 1913, an article on 'Fossil Footprints near Scarborough,' recorded the discovery of dinosaurian footprints in fallen blocks.

Early in January, 1914, Messrs. Wallis and Temporley saw further footprints on blocks of stone about a mile further north than those previously found. Further search was made in the new locality and the footprints were found *in situ*.

A cartroad from Burniston to the beach reaches the sands a little over half a mile south of Long Nab, and cuts through the rock containing the footprints. The stratum can be traced for a considerable distance to the north and south, being more persistent than the beds usually are in the Estuarine Series, and the footprints, many of which were imperfect, can be traced half a mile north of the cartroad, and a quarter of a mile south, or three quarters of a mile altogether. They cannot, however, be seen all the way, but only at intervals.

All the perfect specimens are of the usual three-toed kinds, as usual varying considerably in size, some being only $2\frac{1}{2}$ in. in length, and others $4\frac{1}{2}$ or 5 in. One of the largest, on a fallen block, gives a stride of a yard. Some dozens can be seen in the fallen blocks and *in situ*.

The strata belong to the Upper Estuarine, that is they occur between the Cornbrash and the Scarborough Limestone, and consist, as usual, of alternations of shale and sandstone, as shown in the accompanying section by Mr. Bevan.

The particular stratum in question appears to be barren of other fossils, as careful search was made for considerable distance without result. Some distance below is a bed containing what appear to be casts of Unios, but they are so weathered that the identification is doubtful.

The underlying shales, like many strata is this series, yield specimens of ferns and cycads.

The impressions *in situ* are in the form of casts in relief on the under surface of the bed, which, in many cases, projects beyond the shale beneath, so that the impressions must have been made in the mud now forming the shale bed. It is, however, so crumbly and brittle, that it is hopeless to try to get the actual impressions, of which there must have been hundreds. Along with the footprints are curious horse-shoe shaped casts which may have been made by the droppings of the animals. Altogether about a dozen of these were seen.

The strata, which are almost horizontal, do not stretch from one bay to the other, so that the latter cannot be traced from

The persistent band containing the footprints.

Nearer view of footprint bed.

the place where found originally to the section drawn, but it seems fairly clear that they do not belong to exactly the same horizon, as the strata between are quite distinct. Yet the rock in which the casts occur is strikingly similar in the two localities. The southern locality is probably higher stratigraphically.

The photographs (plate XVI.) show the persistent bed containing the casts, and will enable any visitor to find the bed.

Knowledge for April contains an article on a British Folk-Lore Museum in which the writer, Mr. W. R. Butterfield, wrongly accuses his colleagues in the museum world with neglecting objects dealing with folk-lore. We are familiar with most of the museums in the country, and can assure Mr. Butterfield that very few indeed neglect folk-lore relics now-a-days, whatever may have been the case in the past. In the same number Mr. W. Mark Webb deals with Museums and Education, in which he gives some useful hints for school museums.

Man and Other Poems and a Preface by **Marie C. Stopes,** London : W. Heinemann, 76 pp., 3/6 net. Mrs. Huxley, it will be remembered, wrote a book of poems, and now Dr. Marie C. Stopes (who on page 54 styles herself the 'fossil botanist,') has followed suit; but naturally she has gone one better, and in addition to the verses, she has written to some length to explain how it happens that she has rhymed. Her opinion seems to be that a poet is not the creator, but merely the tool in the hands of the poem. 'The poem seems to be constantly forming within the poet and has to be written.' She anticipates criticism, however, by asking, 'If she claims external and direct inspiration for poets, why are her own verses not finer ?' She gives the reason that as yet she is 'an imperfect instrument,' and, of course, on that point she is the best judge. She gives some quaint, and possibly hardly poetic accounts of the way some of her poems were written. For instance, 'In Tokio once, when I was cycling in haste to the University, a poem insisted on being born. I resisted it, but in the end had simply to get off the bicycle, otherwise *the thing* would have been mutilated.' Another time she was closed up in a stuffy room and on opening the shutters, flung her arms out towards the moon and cried, 'Oh, Moon,' etc., and 'as quickly as one could speak, rattled off some verses which she immediately put to paper, and they are given on page 20.' The last verse reads :—

Wise Queen of the Night,
Thou hast loved an Ideal,
And kept thy pure beauty
From taint of the Real !
Yet dost thou ne'er dream
Of the warmth and the bliss
That comes of the meeting
Of two in a kiss.

which shows that even a 'fossil botanist' has another side to her nature. Judging from the poems, Dr. Stopes has had many interesting experiences, but we must not enter into these. We particularly like her 'Aspirations' and 'The Brother.' Her chief poem, 'Man' has many passages that are hardly poetic, though in view of the subject, this is quite possible. For instance, 'The strong-limbed creature runs his college race; Mud flecks his hairy calves, so swift his pace; The sweat pours down his forehead to his nose.'

Joseph Anthony Martindale.

In Memoriam.

JOSEPH ANTHONY MARTINDALE, 1837—1914.

(PLATE XVI.).

THE small county of Westmorland, prolific beyond others in comparison to its area in men of intellectual attainments, the land of Lawson and Gough, of Ruskin and Southey, has just lost one of its brilliant trio of cryptogamic botanists by the decease, at Staveley, on the 3rd of April, of Mr. J. A. Martindale, who, as a lichenologist, was one of the mainstays of this journal some twenty years ago, his excellent list of the Lichens of Westmorland appearing at intervals.

Mr. Martindale was a native of the adjoining county of Durham, being born at Stanhope, in Weardale, the eldest of the seven children of Mr. John Martindale, who was afterwards Mathematical Master at Bede College, Durham. His natural ability developed itself so early that at the age of seven, in competition with youths of eighteen and nineteen, he was, on examination, awarded a medal for Chemistry, which his father sternly refused to allow him to accept.

Our subject took up the teaching profession, was trained at Battersea Training College, appointed to a school at Stanwix, near Carlisle, in 1857, and in 1859 to Staveley, where he remained as Head Master till his retirement in 1902. He was a born teacher, and after his retirement continued as a lecturer under the County Education Authorities, only relinquishing a course of lectures arranged for 1913-14 owing to ill-health.

He was twice married, first to Mary Ann Seed in 1861, and after her death in 1890 he married Emily J. Ruthven, in 1894, having sons and daughters of both, the eldest son, G. E. Martindale, being himself an accomplished botanist.

Martindale was, both physically and mentally, a vigorous, able and many-sided man. On the physical side he was one of the founders of the old Volunteer movement of 1878 in Staveley, and rose to the rank of Colour-Sergeant and Quarter-Master of the local contingent of the Border Regiment, and he was ever an indefatigable walker, making all his journeys on foot when acting as Inspector of Religious Instruction for the Council Schools of Westmorland. He took an active interest in politics and in the local management of the village, serving on the Parish Council and other bodies.

He was a musician, organist of the old Parish Church, and then of St. James's Church, Staveley, and to a certain extent did a little bit of musical composition. He was an excellent linguist too, as becomes an educational expert, and so useful in scientific work. His lichenological studies made him take

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up German after forty years of age, and apart from his being a classical and an Anglo-Saxon scholar, he acquired French with facility, and was versed in Icelandic and Norwegian.

He was an excellent draughtsman too, a good entomologist, and an antiquary of some distinction, mainly instrumental in the discovery of an ancient British settlement at Millrigg, Kentmere, and his Anglo-Saxon knowledge served him in good stead in discussing the question of local place-names. He had also a good knowledge of geology, and even took up a little osteology.

But it was as a botanist that Mr. Martindale was most renowned. He was associated with J. M. Barnes and George Stabler, both of Levens, and the trio used to meet at each others' houses, month by month, to discuss politics (on which they differed, even to fierce argument) and botany, in which all of them were proficient—and Martindale used facetiously to call this gathering of friends the three-legged Society.

In botany they worked together assiduously and steadily, the flowering plants coming first, and then the trio specialized in the cryptogams, Barnes taking up the ferns, Stabler the mosses, and Martindale the lichens. It was then that he found it necessary to study German, to correspond with Dr. Nylander, the great German authority, and to avail himself of the indispensable German literature. In 1889 he discovered a lichen on Langdale Pikes, new to Britain, *Gyrophora sporochroa*. About that time it was that he contributed the List of Westmorland Lichens to the pages of *The Naturalist*, 1888 to 1890, and 1895, the only list published.

His views, strongly held, on the life history of Lichens, were in opposition to the new theories held by many. He believed, and argued trenchantly, that they were separate organisms like algæ or fungi, and were not fungi parasitical on algæ. It was described as a feast to hear him pour ridicule on the holders of the extreme theory of symbiosis, who state that the fungi devour the algal cells of the lichen. He had studied thousands of lichens under high microscopical powers, but never had he seen one algal cell disappear, he used to say with a gleeful sense of conquest when discussing the views of Sachs or Schwendener.

It was Martindale who placed Westmorland botanical research on a sound footing, following up the labours of Wilson and Hudson in the eighteenth century, and Gough in the nineteenth century—and linking up its history from the time of Thomas Lawson, the Quaker schoolmaster of Great Strickland, and the father of Lakeland botany, who in 1688 sent to the famous John Ray a list of 150 local plants, with the stations in which they grew. For the purpose of systematic botanical work, Mr. Martindale prepared a map which was printed for

the Westmorland Natural History Record, showing in colour the six river basins, Leven and Duddon, Kent, Lune, Eamont, Eden, and Tees. Taking this as a basis he found records of 1,023 plants growing in Westmorland and Lake-Lancashire, out of the total number of 1,858 enumerated in the Eighth Edition of the London Catalogue. Trenchant in his elimination of aliens and garden escapes, he reduced the number to 897, which seem to be the components of the permanent vegetation of the vice-county.

In addition to these there were enumerated 360 mosses, 118 hepatics, 500 lichens and 138 fungi, besides algæ, diatoms, and desmids. His great work in plant systematization included the collating from bibliographical research all the recorded plants of the pre-Linnean period, 1597-1744, entailing a vast amount of scholarly research in the literature of the subject; these plants he enumerated at 253. He had an extensive correspondence with botanists at home and abroad. His own herbarium included about 2,000 flowering plants and 1,000 cryptogams.

As may be supposed, he was associated with the various Westmorland and Lakeland Societies, from the 1868 Kendal Society of which the famous blind Gough was first President, down to the revival in 1912 of the latest Natural History Society. In that year he was elected President, and on his retirement in 1913 he devoted his address to a closely-reasoned lecture on Protoplasm, a learned criticism of Professor Schäfer's famous address to the British Association.

He was commissioned to write the botanical section for the Victoria County History of Westmorland, a work which so far, unfortunately, has not appeared.

His death was not unexpected, for he had been failing in health for the previous few months, although he had been making mental plans for the summer of this year. He was actually confined to his bed for a month, till the end came on the 3rd of April, in his 77th year.—R.

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Desert and Water Gardens of the Red Sea, by **Cyril Crossland.** Cambridge University Press, 158 pp., price 10/6 net. Not only has Mr. Crossland succeeded in producing a remarkably readable book dealing with the natural history of a very important but usually neglected area, but he has also given a very interesting account of the natives, and the shore formations of the coast. After dealing with the coast and the human inhabitants, their religion, daily life and the life of the women, he has some interesting remarks on the Sailors, Fishermen, and Pearl Divers of the Red Sea. The second portion of the work, however, will probably more particularly appeal to our readers, as it gives a very exhaustive and well illustrated account of the Corals and Reefs, as well as of the geology of the Red Sea area, and a history of the sea itself. We must congratulate Mr. Crossland, who is the marine biologist of the Sudan Government, for the very healthy account he gives of the district.

FIELD NOTES.

LEPIDOPTERA.

Emperor Moth near Halifax.—When on Norland Moor with two friends on Sunday, April 19th, we noticed a burnt patch of moorland on which we counted twenty-five scorched and burnt cocoons of the Emperor Moth (*S. carpini*), and on two more patches similar numbers accounting for at least sixty or seventy of these insects. This will account for the scarcity, this season, at our nearest locality for the moth. The farmers fire the ling, etc., here to keep it in check.—L. Alderson, Halifax.

[This firing of the moors has become very general, and its effect from an entomologist's point of view is most disastrous. In the Huddersfield district *Saturnia carpini* and *Bombyx quercus* appear to have been well nigh exterminated by it, though both were formerly very common; and many less conspicuous, but equally interesting species, must of course be sharing the same fate.—G.T.P.]

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BIRDS.

Waxwings at Sleights.—Two waxwings were seen a few days ago, feeding upon the berries in Sleights Village, and four or five have lately been seen in the woods further up the dale. Mr. Joshua Moore has interested the keepers of the district in these birds so they are not likely to be molested. —Joseph T. Sewell, Whitby, April 2nd, 1914.

Blue Headed Wagtail at Mytholmroyd.—I was informed by Mr. Harry Stansfield, Mytholmroyd, that a Blue Headed Wagtail was consorting with a small party of Yellow Wagtails in a field at Mytholmroyd on the 17th April, and on the following afternoon I saw the bird myself. There were both male and female yellow wagtails and I had an opportunity of comparing it with both at close range through Zeiss glasses. The slate-blue head, cream throat, prominent light eye streak, and colouration of the dorsal plumage were conspicuous. It was a very beautiful specimen, but its presence was apparently unwelcome to the yellows, which persistently harrassed it, although the blue headed specimen stood its ground gamely. On the two succeeding days it was seen in the same place by other observers. There is only one previous record of the blue headed wagtail which can be regarded as authentic in the Hebden Bridge district, a specimen obtained in 1879. Mr. James Cunningham, of the Halifax Museum, who procured this species by the side of a small pond at Warley, however, claimed in the columns of *The Halifax Naturalist* some years ago, to have frequently seen the Blue Headed Wagtail in the Hebden Valley in previous years.—Walter Greaves, Hebden Bridge. .

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Papers and Records relating to the Geology and Palæontology of the North of England (Yorkshire excepted), published during 1913.

T. SHEPPARD, F.G.S.

For particulars of previous instalments see *The Naturalist* for 1913, page 261.

A few items omitted from previous lists are now included. Most of these refer to Northumberland and Durham, as we have only recently had an opportunity of seeing a set of the Proceedings of the University of Durham Philosophical Society in which they are contained.

With regard to the papers read at the British Association, now that each section publishes the Presidential Addresses and abstracts of papers, during the meeting, as well as the authors' copies for the Press, etc., these items appear twice, viz., during the year of the meeting and also in the following year when the bound volume appears. The former are therefore referred to as 'leaflets' or 'wrappers,' and students would do well to bear in mind that as these are often 'rough proofs,' or 'uncorrected proofs,' they may differ slightly from the papers as they appear in the final report.

The Yorkshire items for 1913, as well as those for 1910-12, will appear in a Bibliography which is being edited by the present writer for the Yorkshire Geological Society. It is hoped that this will appear in a few weeks' time.

The 'North of England' includes the counties of Cheshire, Derbyshire, Nottinghamshire, Lincolnshire, and to the north thereof; including the Isle of Man.

1902.

P. PHILLIPS BEDSON. Northumberland.

The Gases Enclosed in Coal and Coal-Dust. 'Proc. Univ. Durham Phil. Soc.,' Vol. II., Part 2, 1902, pp. 69-77.

1905.

JOHN COGGIN BROWN. Westmorland.

A Note on Molybdenum [a mineral in Shap granite]. 'Proc. Univ. Durham Phil, Soc.,' Vol. II., Part 4, 1905, pp. 163-165.

1907.

STANLEY SMITH. Yorks., Northumberland, Lake Dist.

The Cleveland Dyke [with analyses]. 'Proc. Univ. Durham Phil. Soc.,' Volume II., Part 6, 1907, pp. 239-242.

J. A. SMYTHE. Durham.

On Peaty Deposits from a Pit-fall at Tantobie, County Durham. 'Proc. Univ. of Durham. Phil. Soc.,' Vol. II., Part 6, 1907, pp. 247-253.

1908.

J. A. Smythe. Northumberland.

Note on a Flint Implement found near Newcastle [made of Purbeck (?) freshwater chert]. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 1, 1908, pp. 13-14.

F. G. Trobridge. Northumberland.

The Gases enclosed in certain Coals and Coal-dusts from the 'Busty Seam'. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 1, 1908, pp. 5-6.

1909.

A. Bell. See David Woolacott.

T. Herdman. Durham.

The Glacial Phenomena of the Vale of Derwent. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 3., 1909, pp. 109-118.

Mary K. Heslop. Northumberland and Durham.

On Some Elementary Forms of Crystallization in the Igneous Dykes of Northumberland and Durham. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 2, 1909, pp. 37-46.

J. E. Marr. Westmorland.

Westmorland [includes chapters on Geology]. Cambridge, 1909, pp. x. + 151.

Edward Merrick. Northumberland, Durham.

On the Superficial Deposits around Newcastle-upon-Tyne. 'Proc. Univ. Durham. Phil, Soc.,' Vol. III., Part 3, 1909, pp. 141-152.

E. Merrick. See David Woolacott.

J. A. Smythe. See David Woolacott.

W. J. Wingate. See David woolacott.

David Woolacott. Durham.

On a Case of Thrust and Crush brecciation in the Magnesian Limestone, County Durham. Abstract]. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 2, 1909, pp. 47-48.

David Woolacott. Northumberland, Durham.

Boulders Committee [includes records by J. A. Smithe, E. Merrick, (D) Woolacott, W. J. Wingate and A. Bell]. 'Proc. Univ. Durham Phil. Joc., Vol. III., Part 2, 1909, pp. 61-62.

David Woolacott. Northumberland, Durham.

Boulders Committee, Report No. 3, March, 1909 [includes records by (D.) Woolacott, (J. A.) Smythe and E. Merrick]. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 3, 1909, pp. 175-176.

David Woolacott. Northumberland, Durham.

Note on Borings at Derwenthaugh and Dunston. 'Proc. Univ. Durham Phil. Soc.', Vol. III., Part 3, 1909, pp. 153-156.

1910.

H. H. Arnold-Bemrose. Derbyshire.

Derbyshire [includes chapters on Geology]. Cambridge, 1910, pp. x.+ 174.

A. Bell. See D. Woolacott.

T. A. Coward. Cheshire.

Cheshire [includes chapters on Geology]. Cambridge, 1910, pp. x.+207.

E. Merrick. See D. Woolacott.

Stanley Smith. Lake District.

On the Grainsgill Greisen. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 5, 1910, pp. 241-244.

[J. A.] Smythe. See D. Woolacott.

G. Weyman. See D. Woolacott.

G. Weyman. Northumberland, Durham.

On the Section of the Great Whin Sill near Gunnerton. 'Proc. Univ. Durham Phil. Soc.,' Vol. III., Part 4, 1910, pp. 201-206.

[D.] Woolacott, [J. A.] Smythe, A. Bell, G. Weyman and E. Merrick. Northumberland, Durham.

Boulders Committee, Report No. 4, May 1910. 'Proc. Univ. Durham Phil. Soc.', Vol., III., Part 5, 1910. pp. 331-333.

1911.

A. Ball. See S. R. Haselhurst.

R. Cooksey Burton. Northumberland.

On the Formation of Kaolinite in some Coal-measure Shales. 'Proc. Univ. Durham Phil. Soc.,' Vol. IV., Part 1, 1911, pp. 24-29.

A. A. Hall. Northumberland, Durham.

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S. R. Haselhurst, E. Merrick, [D.] Woolacott, G. T. Mackay, A. Ball, and [J. A.] Smythe. Northumberland, Durham.

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[J. A.] Smythe. See S. R. Haselhurst.

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W. BOYD DAWKINS. Isle of Man.

Coal and Salt in the Isle of Mann. 'Mannin,' Vol. I., No. 1, May 1913, pp. 28-32. (See *The Antiquary* for August 1913, page 320.)

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ERNEST EVANS. Lancs.

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E. J. GARWOOD. Northern Counties.

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EDMUND JOHNSTON GARWOOD. Westmorland, Lake District, Yorks., Furness.

The Lower Carboniferous Succession in the North-west of England [with Appendices by A. Smith Woodward and Madeline Munro]. 'Quart. Journ. Geol. Soc.,' Vol. LXVIII., Part 4, No. 272, for December 1912 [issued January 13th, 1913], pp. 449-586

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The Coal Resources of the World. An inquiry made upon the initiative of the Executive Committee of the Twelfth International Geological Congress, Canada, 1913. With the assistance of Geological Surveys and Mining Geologists of Different Countries. 3 vols., sm. 4to, about 400 pp. each [includes 'The Coal Resources of Great Britain,' by A. STRACHAN, in Vol. II., pp. 597-628] and atlas of 66 maps in colours [No. 29 is of England and Wales, by A. STRACHAN], 13½ by 19½ inches.

[J. GERRARD.] Lancs., N., S.

Quarry Inspection Reports, 1911. Mr. Gerrard's Report on the Manchester and Ireland District (No. 5). *The Quarry*, January 1913, pp. 21-24.

WALCOT GIBSON. Yorks., Notts.

The Concealed Coalfield of Yorkshire and Nottinghamshire. Geol. Survey Memoir, 1913, pp. vi+122. See also *Geol. Mag.*, August 1913, pp. 373-4, and *The Naturalist*, July 1913, page 246.

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J. W. GREGORY. Lake District.

The Nature and Origin of Fiords [brief reference to the Lake District]. London, 1913, pp. xvi+542.

(*To be continued.*)

Naturalist,

YORKSHIRE NATURALISTS' UNION.

ENTOMOLOGICAL SECTION.

A WELL attended meeting of this section was held in Leeds, on Saturday, March 21st, under the Presidency of Dr. Croft. The members assembled in the Philosophical Hall, where they had the pleasure of seeing the fine collection of Moths made by Mr. Lloyd while in South Africa. The insects had been taken at electric light, and many fine and extraordinary species were represented.

By the kind invitation of Professor Garstang, the members then proceeded to the University, where the 'Clarke' collection of Exotic and European Lepidoptera was shown. The specimens were in fine condition and of exquisite beauty. Mr. Mark Sykes also showed cases of models and their mimics in many species of foreign butterflies.

In the evening, Professor Garstang gave an instructive address on 'Mimicry in Exotic Butterflies.' He stated that many species liable to the attacks of birds mimicked in colouration the inedible species occurring in the same neighbourhood with them. Cases containing specimens were handed round showing many striking examples where the model and the mimic were almost identical, although the species were generically widely separated. The Professor detailed the polymorphic colouration of the females of a widely distributed African *Papilio*. The male and female in Madagascar are both of one type in colour and marking, while on the African continent seven forms of the female are known all distinct from each other in colour, and closely mimicking various species of inedible Danaids that occur in different areas of that continent, while the males keep to the Madagascan colour type in all cases. Other instances were given where in various regions the inedible species seem to have set fashions in colours and markings, which the edible species follow assiduously. A discussion followed by Messrs. Taylor, Porritt, Sykes, and Lloyd. Mr. B. Morley then read notes relating to swarms of spring caterpillars which have occurred in one wood four years in succession. These are given on another page. A vote of thanks was cordially given to Dr. Croft, who had kindly entertained the members to tea; and to Professor Garstang for his kind invitation and the great interest he had taken to make everything so enjoyable.

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Per Rail. The Great Central Railway Company has issued a magnificent volume with the above title, which deals fairly exhaustively with the area served by the Company. There are numerous illustrations, diagrams and maps, one of the last named showing a plan and section of the concealed coalfields of the North of England, being of exceptional interest.

Guide to the Geology of the Whitby District, by Lionel Walmsley. (Horne and Son, Whitby, 37 pp., 1s. net). Mr. Walmsley states that six years ago he first became acquainted with the science of geology. He now writes a guide to the Geology of the Whitby District, which is presumably reprinted from a local paper. During the past six years at any rate, he seems to have become fairly familiar with the principal memoirs dealing with the district, and in these has deeply delved, and has made tracings of the plans, sections, fossils, etc. The guide is presumably meant for the casual visitor, though for that purpose it is a little technical here and there. A geologist will find it useful. For a small pamphlet of 37 pages, printed from newspaper type and containing advertisements, the price of 1s. seems rather stiff, and we trust if the author's hope for a second edition is realised, he will dispense with the advertisements and sell the pamphlet at sixpence.

NEWS FROM THE MAGAZINES, etc.

In *The Zoologist* for March, Colonel C. E. Shepherd has an interesting paper on 'The Location of the Sacculus and its Contained Otoliths in Fishes.'

Under the heading of 'Naturalists on the Nidd,' *The Yorkshire Observer* for April 14th, contains an admirable account of the Easter excursion of the Yorkshire Naturalists' Union.

The Royal Society for the protection of birds has issued a special Plumage Bill number of *Bird Notes and News*, as No. 1 of Vol. VI. It should be consulted by anyone interested in the subject.

The Irish Naturalist for April is almost entirely devoted to a notice of the work of the late Major G. E. H. Barrett-Hamilton, and includes a lengthy list of his writings which date from 1887 to 1913.

In the *Journal of Conchology* for April, Messrs. A. E. Boycott and J. W. Jackson give observations on the Anatomy of Helicella 'heripensis Mabille,' and Mr. J. T. Marshall contributes additions to 'British Conchology.'

In the *Transactions of the Entomological Society of London* (Part 4 for 1913, issued March 31st, 1914), Mr. Fred Enock has a note on a new genus of Mymaridæ, *Neurotes iridescens* Enock, from Hollington Wood Hastings.

The Lancashire Naturalist for March includes some additions to Ashton-under-Lyne District Flora, by Mr. F. Collier; Myriapoda of the Chester District, by Dr. A. Randall Jackson; Early mining Implements by Mr. T. Sheppard; and *Chelifer* (*Chernes*) *panzeri* in Cheshire, by Mr. R. Standen.

The *Journal of the Board of Agriculture* for March contains papers on American Gooseberry Mildew: Spraying Experiments against *Sphærotheca Mors-uvæ*, together with some observations on the Life-History of this Mildew, by E. S. Salmon; Some Douglas Fir Plantations; and the Cultivation of the Seakale, by E. Beckett.

In *The Micrologist* for April, published by Messrs Flatters, Milborne and McKechnie, Manchester, are included notes on Fungi by Herbert Gunnery, and notes on Section Cutting, Mounting, etc., by Abraham Flatters. There is also an excellent plate showing parts of Phantom Larva, Larva of Common Gnat, and Daphnia.

The *Proceedings of the Geologists' Association of London*, Vol. XXV., Part 2, 1914, contain an illustrated account of the excursion to the Nottingham District, by Professors J. W. Carr and H. H. Swinnerton, and in the same journal Messrs. H. Dewey and R.A. Smith describe 'The Palæolithic Sequence at Swanscombe, Kent.'

The Journal of the Derbyshire Archæological and Natural History Society, Vol. XXXVI., contains many valuable papers, most of which, however, hardly come within the scope of this journal. There is an elaborate account of the Place Names of Derbyshire, by Mr. B. Walker. The Rev. F. C. R. Jourdain contributes Derbyshire Zoological Notes for 1913, and Mr. H. C. Hayward writes on the local Lepidoptera in 1913.

The Library Circular for 'Spring, 1914,' issued by the Sunderland Public Library, includes an illustration of a case presented by Lord Durham to assist Mr. Deas to lead the blind. It contains a leopard, a bear, and a fish-eating crocodile, all apparently grabbing for the same 'Indian Antelope or sasin.' Judging from the illustration, we should put our money on the leopard. The objects are 'displayed in jungle scenery, which most effectively shows them in their more or less (sic) natural haunts.'

Toothwort at Knaresborough.

The Lake at Plumpton.

Photos by [*R. Fortune.*

NOTES AND COMMENTS.

SPORIDIA OF PUCCINIA MALVACEARUM.

In the *Annals of Botany* for April, Mr. Wilfrid Robinson has an interesting note on 'Some Experiments on the Effect of External Stimuli on the Sporida of *Puccinia Malvacearum*, Mont.' From this we learn that, 'The sporidia of *P. malvacearum* have been shown to be negatively heliotropic, and this is also the case for the conidia of a species of *Botrytis*; whilst with conidia of *Penicillium*, *Alternaria*, *Peronospora*, and aecidiospores of *Puccinia poarum* no irritability to light was apparent. Other influences shown to affect the germ tubes are moisture and contact. As regards moisture, the germ tubes tend to grow out of a drop of water into the moist atmosphere around. On the other hand, germ tubes, on the surface of gelatine in a moist atmosphere, tend to penetrate the gelatine. These influences are difficult to analyse satisfactorily. With respect to contact, the tip of the germ tube swells and becomes closely applied to the epidermal surface of both the host and non-susceptible plants. This may perhaps be a result of the contact.'

DRAWINGS OF FUNGI.

We are interested to learn that the fine collection of water-colour drawings of British Fungi, done from nature by Chas. Crossland, Halifax, have been acquired for the Herbarium, Royal Botanic Gardens, Kew, along with the specimens from which the majority of the figures were made. Almost without exception, the fungi portrayed have been found in Yorkshire, and include many new discoveries. The collection of coloured drawings represent about 500 species, each on a separate sheet; in addition to these are numerous pen-and-ink, or pencil sketches on wrappers, delineating the chief characters of the specimen enclosed. The drawings consist principally of enlarged microscopic features of the Discomycetes—the group to which Mr. Crossland has devoted special study for over a quarter of a century. The remainder are general, with a fair proportion of Hyphomycetes (moulds). Copious notes accompany the figures. Many bear the name of the late H. T. Soppitt, and others that of the late James Needham, as collectors. While we do not like the idea of the drawings leaving the county there is much satisfaction in knowing they have got to a place where they are most likely to be of service to students of Mycology.

THE PALÆONTOGRAPHICAL SOCIETY.

'The Palæontographical Society's Monograph' for 1913 was recently published, and is principally occupied by a remarkable account of 'The British Pliocene Mollusca,' by Mr. F. W. Harmer. This is a supplement to S. V. Wood's

well-known 'Monograph,' published by the same Society over 60 years ago. Mr. Harmer's memoir alone occupies 200 pages and 24 plates. The Misses Ellis and Wood contribute Part X. of their work on 'British Graptolites,' and Mr. W. K. Spencer writes on 'The Palæozoic Asterozoa,' in which he gives a remarkable Introduction to their study. Dr. Cowper Reed gives a supplement to his work on 'Girvan Trilobites,' and the Monographs of the late Dr. Traquair on 'Carboniferous and Old Red Sandstone fishes,' are concluded.

MUSEUM REGULATIONS.

The Yorkshire Observer draws attention to a quaint rule in vogue at the British Museum 150 years ago:—In the year 1759 the Trustees published their 'Statutes and Rules Relating to the Inspection and Use of the British Museum.' This document set forth that persons wishing to inspect the national collections must make previous application to the porter, in writing, stating their names, occupations, places of abode, and the day and hour at which they desired to be admitted. These applications were laid before the secretary in attendance every evening. If this official judged the applicant to be a person of sufficient respectability he authorised the porter to grant a ticket. But the troubles of the candidate for admission did not end there. The regulations stated that no more than ten tickets should be issued for each hour that the Museum was open. When ten ticker-holders had gathered in the waiting-room they were admitted, but this small party was divided into two of five, each being taken round by an official. One hour was the utmost time allowed for the inspection of one department, and, on a signal being given by the ringing of a bell, the visitors had to pass on to another part of the building. Three hours was the limit of time that any company might spend in the Museum, and a register was kept of those persons who transgressed any of the rules, the porter being instructed never to admit them again.

'PUNCH,' AND NATURAL HISTORY.

We have previously had to correct *Punch* for his lack of natural history knowledge. His latest is a quotation from the *Hexham Herald* that 'He would rather he went for three years, for one could readily understand that for the first year he simply touched the fungi of the Council business.' To this *Punch* adds, 'Motto for rival town council, "There's no moss on us."' *Punch* ought to know that moss is no more a fungus than he is. Of course if the matter is a joke, or a veiled advertisement for *The Times*, or *The Daily Mail* (all of which occur quite frequently in the pages of that journal nowadays) we apologize!

MOVEMENTS OF AQUATIC MICRO-ORGANISMS IN RESPONSE TO EXTERNAL FORCES.*

HAROLD WAGER, F.R.S.

In choosing as the subject of my address the 'Responses of Micro-organisms to External Forces,' I am fully aware that we are still far from a complete understanding of the physiology of even the most simply constituted organism. But anyone who has observed, under the microscope, the varied movements exhibited by microscopic organisms, must have been led to reflect upon the causes to which they are due and to what extent their movements may be the result of conscious or unconscious efforts. All such living organisms require food and oxygen. Have they any power of judgment, or any special sense organs by means of which they may be directed to places where food and oxygen are to be found? In other words are their movements purposeful, or are they merely mechanical responses to such external forces as light, heat, gravity and the like?

I remember on one occasion stopping to look at a large shallow pond which was of a bright green colour owing to a multitude of chlorophyll containing organisms. When I first looked at it the water appeared to be a dense and uniform green liquid, but a minute or two later it was seen to change its character. The organisms were settling down to the bottom, not uniformly but in irregular threads or streaks, which before long rested on the mud leaving the water clear. Here they formed a coarse network with meshes of varying size on the surface of the mud. This sinking of the green particles invariably took place during the passage of a cloud over the sun; when the sun broke out from the cloud, they slowly rose to the surface again. Sometimes a flocculent appearance, at other times beautiful streaks of green extending in all directions were observed. These varied movements, the rising and falling of the organisms, the formation and breaking up of the networks and other groupings all appeared to be regulated by the varying intensity of the sunlight.

When, however, we seek to inquire into the means by which the organisms respond to the action of light, we are confronted with other factors, such as gravity and temperature, which must be considered before we can arrive at any satisfactory explanation of the movements observed. Experiments must be so conducted that the conditions under which the movements take place can be modified one by one.

Among the various organisisms that have been thus

*Presidential Address to the Yorkshire Naturalists' Union for 1913.

1914 June 1.

experimentally investigated may be mentioned the zoospores of Algae (green and brown), *Euglena* (green), Barnacle larvae (colourless), *Volvox* (green), *Chlamydomonas* (green), *Phacus* (green), *Trachelomonas* (green), *Astasia* (colourless), the zoospores of certain fungi (Chytridineae) and others, but *Euglena viridis*, a well-known organism found in stagnant water rich in organic matter, is particularly suitable for experimental investigation. It is often abundant in the liquid running from manure heaps, on which it forms a light green scum; it is also plentiful on sewage farms.

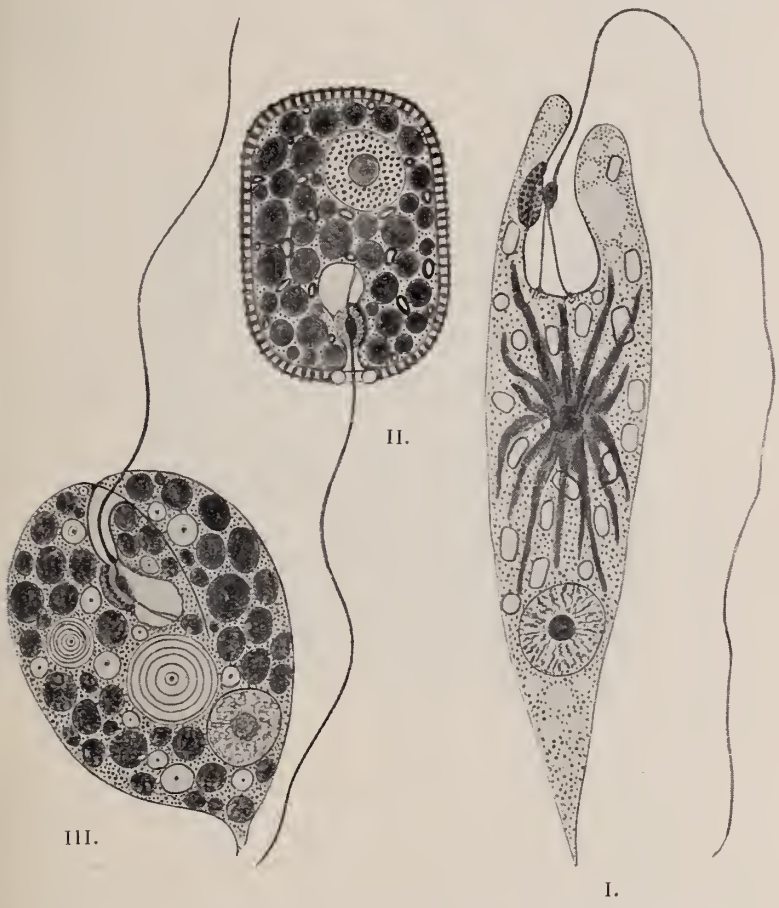
Euglena is capable of existing either in a motile or in a non-motile condition. In the motile condition it is a free swimming organism, spindle shaped, with an obliquely truncated fore end and a pointed posterior end (Fig. 1). The cell-protoplasm contains chlorophyll-bodies which may be scattered uniformly except for a clear space at the fore end or may radiate from the centre, leaving both ends free. Grains of a substance (paramylum) resembling starch but not coloured blue by iodine may also be found anywhere in the cell; they are generally more numerous in the neighbourhood of the chlorophyll-bodies. A nucleus is usually seen near the hinder end of the cell. There is a mouth on the under side of the fore end, which leads by a narrow pharynx to a large internal cavity. A pulsating vacuole is present and there is a conspicuous red eye-spot on the dorsal side of the pharynx. Locomotion is effected by a single long flagellum, which drives the body forward by striking the water obliquely. The organism revolves on its longitudinal axis as it travels, taking a well-marked spiral path.

The flagellum arises from the protoplasm on one side of the pharyngeal cavity, to which it is attached by means of a bifurcate base, and passes to the exterior through the gullet in close proximity to the red eye-spot. Just at the point where it passes the eye-spot, the flagellum bears a small refractive granule or swelling which is so placed that it is in very close contact with the eye-spot, but not organically connected with it (Fig. I.).

The eye-spot is a very simple structure. It consists of a nearly circular layer of deep orange-coloured granules embedded in the protoplasm in close contact with the gullet around which it is curved. The granules are probably composed of, or closely related to, the pigment carotin.

Under favourable light conditions, *Euglena* is nourished by the decomposition of carbon dioxide brought about by the light absorbed by the chlorophyll; but under certain conditions, which are not clearly understood, when the light is weak and the Euglenæ are in a good organic nutrient solution of potato-starch, the chlorophyll bodies in many individuals,

sometimes in all, are pushed out of the way to the posterior end of the cell and the organism then lives saprophytically as an animal or other non-chlorophyll containing organism. If the light conditions again become favourable the chlorophyll is brought back into its normal position, and the chlorophyll



I.—***Euglena,*** showing radiating chloroplasts in the centre, paramylum grains, nucleus at posterior end of cell, eye-spot and flagellum at anterior end. II.—***Trachelomonas,*** and III., ***Phacus,*** also show a similar structure.

function being once more resumed, the organism lives as a green plant. In both cases an abundant store of food is produced in the cell in the form of paramylum grains.

Under certain conditions the motile state persists, under

other conditions the non-motile state is a persistent one, but *Euglena* can pass from one state to the other with facility should the conditions become unfavourable. We find for example, that the non-motile condition is induced in the presence of light and air (oxygen), that is, under such conditions as allow of a vegetative existence by means of its chlorophyll. If the conditions are unfavourable for the proper functioning of the chlorophyll the organism has to subsist upon its organic food supply, and under such conditions it tends to remain motile.

Euglena, like many other motile chlorophyll containing organisms, is very sensitive to the light. Our knowledge of this is due mainly to the investigations of Strasburger* and Engelmann†, but important contributions to our knowledge of the more intimate details of the phenomena have been made by numerous other investigators among whom may be mentioned Stahl, ‡ Loeb, § Jennings, ‖ and Mast. ¶

Generally it has been found that Euglenæ are attracted by light of moderate intensity and are repelled by a strong light. The degree of sensitiveness which they exhibit in this respect varies considerably, however, even in individuals of the same culture. The effects produced are very striking and can very easily be demonstrated.

They are strongly attracted by a bright light, such as that of a gas-flame or incandescent burner focussed, by means of a substage condenser, upon a microscope-slide on which a drop of water containing Euglenæ has been placed. Such a spot of light will attract, in the space of about one minute, the majority of the cells in the field of the microscope, as seen by a one-inch objective ; and in two minutes only very few will be found outside the light area. If a large number of cells are present, they will form a seething mass in the light space, perhaps two or three layers deep. On turning down the condenser so as to get the light spread evenly over the whole field of the microscope, they begin at once to move away rapidly in all directions, and in one or two minutes are found in all parts of the field. The intensity of the light appears to be a factor in the precision with which the movements are effected. In light of low intensity the path taken by the Euglenæ in the

* 'Wirkung des Lichtes und der Wärme auf Schwärmsporen.' Jena Zeitschr. xii., 1878.

† 'Ueber Licht und Farbenperception niederster Organismen.' Pflüger's Archiv, Bd. 29, 1882 (see J.R.M.S. 1883, page 81).

‡ 'Ueber den Einfluss von Richtung und Stärke der Beleuchtung auf einige Bewegungserscheinungen im Pflanzenreiche." Bot. Zeitung, 1883.

§ 'The Dyamics of Living Matter.' New York, 1906.

‖ 'Behaviour of the Lower Organisms.' New York, 1906.

¶ 'Light and the Behaviour of Organisms.' New York, 1911.

direction of the light is much more irregular than in a stronger light.

If they are kept in bright sunlight for any length of time, they come to rest and round themselves off ; and if they remain in a good light for some days, the cells gradually become encysted. The effect of a strong light is always to produce encystment (Fig. IV.).

Under normal conditions the Euglenæ at night round themselves off and form a scum on the surface of the water. They still exhibit sensitiveness to light however. If a small quantity of such a scum is placed in the bright light of an

IV.—Euglenæ in the non-motile vegetative condition. Many of the cells are in a state of division. From a photograph taken through the microscope with a $\frac{1}{6}$-inch objective.

incandescent gas mantle focussed through a substage condenser, many of them again become elongated and move about freely in the light space. In this condition they show a peculiar response to a decrease in the light intensity. On turning the condenser down so as to reduce the light very considerably, they at once, in most cases, contract in an amoeboid fashion and may become completely rounded off again. If the light is then completely cut off, they remain in the rounded off condition, but if they are allowed to remain in the low intensity of light for some time, they become expanded again and move about slowly and sluggishly in the light space. If we increase the intensity of the light their movements

become more brisk. These various responses appear therefore to be due, in part, to the variation in the intensity of the light.

Many observers have tried to show that light intensity plays no part in the stimulus, but that it is simply the direction of the rays of light that is effective. They assume that the stimulus acts directly on the motile organs, and that the axis of the organism is oriented into such a position that it is acted upon symmetrically on all sides by the external force and is thus kept in a definite position. It is probable however that neither the heliotropic bending of fixed plants nor the heliotaxis of motile organisms can be explained in this simple mechanical fashion ; the stimulus seems to be interpreted by the living protoplasm in some way not at present understood, and the resulting movement or modification in the direction of movement depends upon the nature of this interpretation.

It is obvious that the movements of the organism, as well as any change in the direction of its locomotion, are dependent directly upon the flagellum. Without it the cell is only capable of a very slow contractile movement of its body. The movements of the flagellum undoubtedly originate in the release of energy already stored up in the cell and are not directly due to an external stimulus acting during the time the movements are taking place, but there can be no doubt I think that any change in the direction of locomotion must be due to chemical and physical changes set up in the protoplasm by external stimuli such as light and heat. This does not mean that the responses to these stimuli must therefore be mechanical, or that they are necessarily to be regarded ' as an expression of conscious sensations, discrimination or will.' Our knowledge of the phenomena is not sufficient or precise enough to warrant a strong support of either view at present. Possibly the truth lies somewhere between these two extreme views. There is very little evidence that the response is a conscious one, but on the other hand there is just as little evidence that the response is of the nature of a tropism or a purely mechanical reaction to an external force. We shall see later that the response of *Euglena* to gravity is purely mechanical, but the response to light is much more complex, and more like an ordinary reflex action. We may look upon it as the result of the unconscious adjustment of the organism to the environment, and dependant upon the protoplasmic constitution, or as Jennings terms it, the ' physiological state ' of the cell.

That the nature of the response to light depends upon the physiological state of the cell may be inferred from the variations which are to be observed in the behaviour of organisms under varying temperature conditions. Thus under certain conditions which are not clearly understood, *Euglena* and

other organisms are repelled by the light. This is said to be due to a too great intensity of the light. But this is obviously not the only factor in the response, for light of the same intensity may at one time cause repulsion, at another time attraction, in the same individuals. One of the determining factors is temperature. If the intensity of the light remains constant we find that in bright sunlight at a low temperature Euglenæ are negatively heliotactic; if the temperature is increased some of them become positively heliotactic, and if the temperature is still further increased more and more of them become positive, until finally at a much higher temperature they all become positively heliotactic. If we now gradually lower the temperature, the intensity of the light remaining the same, the Englenæ pass through these varying stages of positive and negative responses in the reverse order, until at a low temperature they again all become negatively heliotactic. The experiment may be repeated many times in succession with the same culture of *Euglena*.

When the temperature remains constant, we find that at a low temperature and low intensity of light Euglenæ are positive, but if the temperature remains the same, as the intensity of the light is increased they gradually become more and more negative, until finally they are all negatively heliotactic.

The general conclusion at which we arrive from these experiments is that when the intensity and temperature are very disproportionate we get negative heliotaxis, but that when the two are more nearly proportional we get positive heliotaxis. Thus at a low temperature and high intensity of light, or at a high temperature and low intensity of light the Euglenæ are negative; at a high temperature and high intensity, or at a low temperature and low intensity of light they are positive.

In support of his view that the movements of organisms towards the source of light are purely mechanical or automatic, Loeb lays a good deal of stress upon the fact that they continue to move towards the source of light 'even if in so doing they must pass from the light into the shade.' The evidence adduced in support of this statement is, however, not conclusive. It is quite true that organisms may pass from a stronger into a weaker light, but it has not been clearly shown that this may not be due to a preference for the weaker illumination. It can for example be easily demonstrated by experiments with *Euglena*, *Chlamydomonas* and barnacle larvae, that they do not always pass into the shade, but that whilst a number of them from the same culture may do so, a large proportion of them may remain in the stronger light, notwithstanding the fact that the direction of the light rays remains the same in both. Thus we expose a shallow vessel

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containing *Euglena viridis* to a lateral illumination from a window as shown in Fig V., the vessel being carefully shaded above and on three sides so as to present the entrance of light rays from other directions. The Euglenæ will at once move towards the window and will accumulate at *d*. If the vessel is now completely turned round, so that the Euglenæ are in the position d^1, and the vessel is then covered with a piece of white paper. they will again move towards the source of light and will gather once more at *d*. The amount of light which passes through the white paper, although considerably weakened, is still sufficient to attract all the Euglenæ to the side *d*. If, however, the experiment is repeated, with a sheet of white paper covering only that half of the vessel nearest the window, the Euglenæ will be seen to collect in large numbers

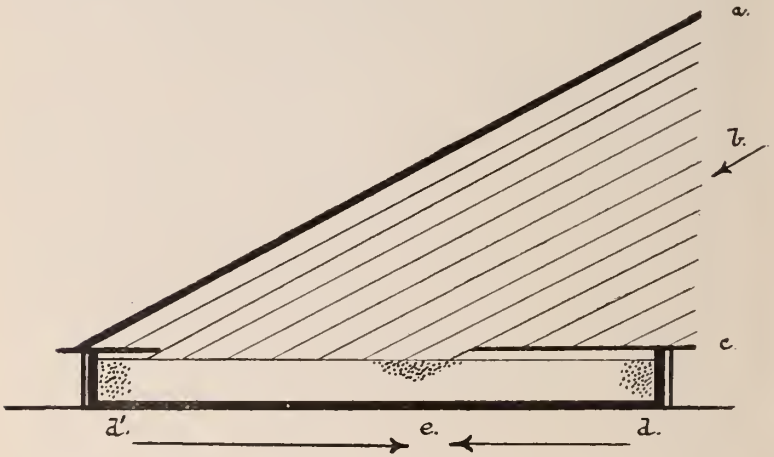

Fig. V.—Shallow vessel containing Euglenæ, to show effect of oblique illumination; the arrow at *b* indicates the direction of the rays of light; *a*, dead black cover to ward off extraneous rays of light; *c*, sheet of note paper; d^1, *e* and *d*, positions taken up by the Euglenæ under varying conditions.

at the edge of the paper *e*, and only a small proportion of them will continue their movement in the weaker light to the point *d*. We have seen in the previous experiment that the light which passes through the paper is sufficiently strong to attract all the Euglenæ, but the last experiment shows that a large proportion of them prefer a stronger light and thus appear to have some power of choice as to whether they will or will not pass into a region of less intensity. If they responded merely in a mechanical fashion to the directive action of the rays of light, they ought all to pass into the region of lower intensity.

(*To be continued.*)

YORKSHIRE NATURALISTS AT KNARESBOROUGH.

(PLATES XVII. AND XVIII.).

A DISTINCT success was the Easter week-end gathering (April 11th to 13th) of the members of the Yorkshire Naturalists' Union at the old-world town of Knaresborough, whose history and romance are so happily blended.

The beauty of Springtime was everywhere in evidence, as voiced by William Morris :—

> " Fair now is the Springtime, now earth lies beholding
> With the eyes of a lover, the face of the sun ;
> Long lasteth the daylight, and hope is unfolding
> The green-growing acres with increase begun."

The charming tracts of open country, and the well wooded slopes by each side of the glorious Nidd, to which access had been freely given, will ever remain a pleasant memory. It was indeed a spot where retreat could be found from the rough world's way, and the situation of the headquarters, the High Bridge Hotel, left nothing to be desired.

The President of the Union, Mr. Thomas Sheppard, was in attendance throughout the week-end, and the members also gave a hearty welcome to Mr. J. F. X. King, of Glasgow, the well-known expert on Neuroptera and Trichoptera.

On Saturday morning an early start was made down the river Nidd, across the fields to Plumpton, where the weathered rocks, and lake, provided much of interest to all sections. The return journey encompassed Birkham Wood, Grimbald's Crag, and Abbey Plain. The physical features were one of the dominating factors of this homeward walk, while it was also rich botanically.

To what base uses the remains of the Abbey have been put is evidenced by the numerous mouldings, window tracery, and fragments of carved stones built into the walls of the outbuildings of adjacent farms, and the boundary walls also show abundant traces of old dressed stone.

The Scriven Estate received investigation by the botanists and conchologists. While this party was having lunch, the fearlessness displayed by a Robin created much comment. The bird first perched on the bough of a hawthorn, immediately behind a lady who was eating a piece of sweet cake. The bird made a sudden dash at the cake, but missed. It was not dismayed, for on the cake being held outward at arm's length, it very cleverly balanced itself over the cake, and succeeded in breaking off a large piece, with which it flew away.

On Monday a considerably augmented party, under the capable leadership of Mr. Riley Fortune, commenced the investigation of the picturesque woods along the banks of the river Nidd, proceeding as far as Nidd Bridge, from whence return was made along the opposite bank.

At the close of this excursion the usual meeting was held, under the chairmanship of Mr. Sheppard. Excellent reports on the work of the sections were presented. Votes of thanks were accorded to the landowners, Lord Furness, Lord Harewood, C. E. Charlesworth, Esq., and E. C. Geddes, Esq., for their courtesy in granting permission to visit their estates, and to Mr. Fortune for his services as guide, and in making the local arrangements. Nine new members were elected, and the Keighley Naturalists Society became affiliated.—W.E.L.W.

Flowering Plants.—Mr. W. E. L. Wattam writes :—

The ground traversed on Saturday, proved most prolific in species. The large grit blocks in the pastures had their upper surfaces whitened with the bloom of *Draba verna* and *Cerastium glomeratum*. Common plants of the hedgerow base were *Sisymbrium officinale*, *Lamium album*, and *Arum maculatum*, but the gem of all, half hidden from the eye, was the glorious scented violet, *Viola odorata*.

Ribes grossularia and *Euonymus europæus* were in the hedgerows. In the vicinity of Plumpton Lake the most prominent sight was the coral-pink staminate flowers of the fine examples of Cypress, in such abundance as to give quite a ruddy tinge to the dark green foliage, and Portugal Laurel white with blossom ; seedlings of the latter were abundant. There are also some fine specimens of *Taxus baccata*, and *Hedera Helix* displayed huge quantities of ripened fruits. Of the water loving plants, *Myriophyllum verticillatum*, *Mentha aquatica*, *Myosotis palustris*, *Polygonum amphibium*, *Hippuris vulgaris*, *Potamogeton crispus*, *Scrophularia aquatica*, *Cardamine amara*, and the golden beauty of *Caltha palustris* came under observation. On the rockery at Plumpton Hall were specimens of *Helleborus fœtidus* and *H. viridis*, which doubtless had been obtained in the immediate vicinity. Birkham Wood showed some interesting phases of ground vegetation. On the drier portions where the trees were mostly Oak and Mountain Elm, *Rubus fructicosus* made dense thickets in the more open parts, while *Loniccra Periclymenum* was in great profusion. Practically dividing the wood is a broad zone of Birch, with a moderate sprinkling of Larch and Spruce Fir. Within this Birch zone the ground is very wet, mosses being abundant, with *Luzula sylvatica*, *L. pilosa*, *Aira cæspitosa* and *Phalaris arundinacea*, with occasional bands of *Pteris aquilina*. Beyond, the trees are again chiefly Oak, Mountain Elm and Hazel ; the dominant feature of the ground carpet here is *Mercurialis perennis*.

In the neighbourhood of Abbey Plain occurred *Atropa Belladonna*, *Anchusa sempervirens*, *Chelidonium majus*, and *Marrubium vulgare*, *Cheiranthus Cheiri*, *Parietaria officinalis*,

and *Asplenium Ruta-muraria* are abundant on the great outcrops of Magnesian Limestone.

In the centre of the village green at Scriven is a fine example of the Evergreen Oak, and within the park the Beech Avenue is a prominent feature. The lake yielded *Myriophyllum verticillatum* and *Polygonum amphibium*. In the woods was an abundance of Wild Cherry and Blackthorn, made extremely effective by reason of the profusion of bloom which they bore.

The woods on each side of the River Nidd would doubtless give greater results later in the year. There are some fine coniferous belts of Larch, Spruce Fir, and Scots Pine, the remaining trees being chiefly Oak, Ash, and Mountain Elm. *Anemone nemorosa* and *Ranunculus Ficaria* provided the flower carpet, though *Primula vulgaris, Cochlearia officinalis, Lychnis diurna*, and *Nepeta Glechoma* displayed a fair amount of blossoms. *Stellaria nemorum, Circæa lutetiana*, and *Veronica hederæfolia* were also noted. *Brachypodium sylvaticum* is a common grass. Many plants of *Aconitum Napellus, Ribes nigrum*, and *Tanacetum vulgare* occur along the banks of the Nidd, but these are doubtless garden escapes. The parasitic *Lathræa squamaria* was in great abundance, the tree rootlets preyed upon being those of Holly, Alder, Beech, Sycamore, Mountain Elm, Larch, and Spruce Fir.

Fungi.—Miss C. A. Cooper writes :—

The area investigated included the woods on the Scriven Estate, and also the woods on the right bank of the River Nidd as far as the railway bridge. On the whole the ground was barren, perhaps partly owing to the dry weather, but more to the early season. The following is a list of the species noted :—

Panæolus campanulatus, P. phalenarum, Collybia velutipes, C. tenacella, Pluteus cervinus, Agaricus campestris (quite good specimens), *Hypholoma Candolleanus, H. fasciculare, Psathyra mastiger, Tubaria furfuracea, Fomes igniarius, Polystictus versicolor, Stereum hirsutum, Hirneola auricula-judæ, Lycoperdon pyriforme* (in one case an exceptionally large mass, all last year's), *Peziza reticulata, P. vesiculosa, Mollisia cinerea, Chlorosplenium æruginosum, Lachnea coprinaria, Corticium confine*, and *Poria vaporaria*.

Myxomycetes.—*Reticularia lycoperdon* and *Didymium difforme*.

Mosses and Hepatics.—Mr. Wm. Ingham writes :—

The most striking feature by the River Nidd from Knaresborough to Nidd Bridge was the great abundance of the Liverwort *Conocephalum conicum*. This large and conspicuous Hepatic fruits from February to April, and even then the fruit is not common, but by the Nidd the plant was crowded with fruit in the best condition for ripe spores.

Another thalloid Hepatic was *Lunularia cruciata*, which

is very abundant on the Dropping Well side of the Nidd. The opinion has been usually held that this Liverwort has originated in flower-pots and gardens, but after seeing it in such abundance by the Nidd from Knaresborough to Nidd Bridge, also in the opposite direction, and on rocks by the River Skell, a long way from Ripon, and on natural rock in other places, I venture to differ from the accepted opinion on the origin of this Hepatic. I now believe Lunularia to be native on stones by streams, and on wet or shady rocks. Since the plant is invariably provided on its surface with semilunar pockets containing lenticular gemmæ, it is highly probable that these thin and light gemmæ have been blown out by the wind and carried to gardens, and thence with the soil to flower-pots. Miss Cooper found *Lophocolea cuspidata* in fruit on soil in the wood. *L. heterophylla* was also found, and the minute *Haplozia pumila*. Three mosses are worthy of mention on the way to Nidd Bridge. These are *Plagiochila latebricola* on rotten wood (found by Mr. R. Barnes), *Barbula tophacea* v. *acutifolia* in fruit and very typical of the variety, and *Mnium rostratum* in fruit.*

Entomology.—Mr. G. T. Porritt recorded that only three species of Neuroptera had been taken, but that one of them, *Tæniopteryx trifasciata*, which he had found rather commonly by beating alders and willows on both sides of the river, was a new record for the county. The other species were *Nemoura meyeri*, and *N. cinerea*, the first-named in abundance.

In Lepidoptera, *Diurnea fagella* was common on the trunks of trees, practically all being of the palest form of the species, in strong contrast with the species in the manufacturing districts only thirty miles or so away, where the specimens were nearly all black. Hibernated larvæ of *Metrocampa margaritata* were common on alder twigs.

In Diptera, Mr. James King, of Glasgow, who was a very welcome visitor at the excursions, had taken a few obscure species, but the determination of which he said would have to be worked out later.

Coleoptera.—Mr. H. V. Corbett reports :—

Collecting was confined to the banks of the Nidd, above Knaresborough. The most interesting finds occurred at a bend in the stream, where sunny sandbanks ended in shingle at the water's edge. Here *Bembidia* were swarming in countless numbers, and *Clivina collaris* was quite common. The best species taken were *Bembidium tibiale*, *B. monticola*, *B. punctulatum*, *B. stomoides*, and *Aphodius pusillus*. My thanks are due to Mr. E. G. Bayford for identifying the last two species. The most remarkable absences were those of

* The bryophytes on the Plumpton Rocks side of Knaresborough are recorded in *The Naturalist* for 1912, page 95, and 1914, page 134, the latter specially with a Bryological Excursion to Plumpton Rocks.

Steni from flood-refuse, etc., of *Coccinellidae* from rubbish and general herbage; and of *Rhizophagi* from bark of all kinds. A larva, probably that of *Rhagium bifasciatum*, F., was abundant in oak and pine wood. The following is the list of species noted :—

Cychrus rostratus, L.
Notiophilus biguttatus F.
Leistus fulvibarbis Dej.
Nebria brevicollis F.
Clivina collaris Herbst.
Pterostichus vulgaris L.
Anchomenus angusticollis F.
A. dorsalis Müll.
A. albipes F.
Bembidium tibiale Duft.
B. monticola Sturm.
B. littorale Dl.
Bembidium punctulatum Drap.
B. stomoides Dej.
Homalota trinotata Kr.
H. sericea Müll.
Conosoma pubescens Gr.
Tachyporus obtusus L.
T. hypnorum F.
T. chrysomelinus L.
Tachinus humeralis Gr.
T. rufipes De Gr.
Quedius molochinus Gr.
Philonthus aeneus Rossi.
Baptolinus alternans Gr.
Lathrobium fulvipenne Gr.
Oxytelus rugosus F.
Aphodius pusillus Herbst.
Cryptohypnus riparius F.
Cis boleti Scop.
Otiorhynchus picipes F.
Sitones hispidulus F.
Ceuthorhynchus assimilis Payk.

HYMENOPTERA.—*Lasius niger* L., was common in the shingle by the Nidd. Mr. H. St. J. K. Donisthorpe, who kindly identified it, states that it has not been previously recorded for Mid-West Yorkshire.

CONCHOLOGY.—Mr. W. Denison Roebuck writes :—

The work of the Conchological Section was done by its President, Mr. W. Cash, of Halifax, its Secretary, Mr. Greevz Fysher, and by Mr. Vincent Corbett, of Doncaster, while Mr. W. Falconer brought a few specimens. Mr. Cash's observations were all made by the Nidd banks close to, above and below Knaresborough. He found *Helicigona arbustorum*, *H. nemoralis*, *Hyalinia cellaria*, all in abundance, a few *H. hortensis*, *H. aspersa*, *Zua lubrica*, *Hygromia rufescens*, a couple of *Pupa cylindracea*, and single examples of *Hyalinia crystallina* and *H. nitidula*.

Mr. Fysher found, in a timber yard at Scriven Park, a few small *Arion subfuscus*, a few juvenile *Limax maximus* var. *fasciata*, and *Agriolimax agrestis*, as well as a few each of *Vitrina pellucida*, *Pyramidula rotundata*, *Hyalinia cellaria*, *H. alliaria* and one *H. crystallina*, and on the south bank of the Nidd near Birkham Wood were a few *Ancylus fluviatilis*, and numerous *Helicella cantiana*. Mr. Corbett in the same localities obtained *Limnæa peregra*, *H. cantiana*, *H. hortensis*, *Sphærium corneum*, *Clausilia laminata* and *Limax maximus* var. *fasciata*. Mr. W. Falconer, in Birkham Wood, found *Clausilia bidentata* and *Zua lubrica*, and at Grimbald Crag, *P. rotundata* and several *Hygromia hispida*.

Mr. Falconer and Mr. Corbett described slugs they had

observed which were apparently *Arion ater* var. *castanea* and *Limax arborum*. The total number of species observed was twenty-five, consisting of five slugs, seventeen land and three freshwater shells.

VERTEBRATE ZOOLOGY.—Mr. Riley Fortune writes :—

During the week end 50 species of birds, 8 mammals, 6 fishes and 2 amphibians were observed. We naturally expected that the genial weather would have resulted in the appearance of a number of summer migrants. To our great disappointment this was not the case only very few species have been seen or heard. During the last excursion of the Union to Bilton and Scotton Banks, the feature of the day was the great numbers of Chiff-chaffs. They were singing on all sides. This year only one bird was heard, though in no subsequent year have we had anything like the number of Chiff-chaffs on the Nidd Banks. The other migrants seen were a single Sandpiper and that one, strange to relate, upon a bank where I have known a Sandpiper's nest almost every year for at least twenty years. Several Swallows and Sandmartins, one House Martin and Wheatear were seen. The Cuckoo was reported to have been heard once, but as the date is exceptionally early for this district, I am afraid it must have been uttered through human agency.*

Several newly arrived Pied Wagtails were seen and also numerous Grey Wagtails in lovely plumage. Two nests of the latter were noted. There were several Dippers and Kingfishers. Jays were both seen and heard, as were also the Great Spotted and Green Woodpeckers. The sibulous note of the Gold Crest was heard several times, as was that of the Tree Creeper. Only two species of birds of prey, the Kestrel and Sparrow Hawk, were noted. On the lake at Plumpton were several pairs of Waterhens, Coots, Mallards and Little Grebes. On the whole, the outing was very pleasant.

On the banks of the lake at Plumpton we came across the remains of a Pike and traces of the Otter which had been feeding upon it ; several times pike were noted on the feed, and the small fry were much in evidence leaping out of the water in their efforts to escape their enemy. Usually, a large number of Toads are to be seen spawning in this lake, but on the date of our visit only two were seen, and several strings of ova.

ARACHNIDA.—Mr. Wm. Falconer writes :—

The localities investigated included, Friday, Crag Top and Abbey Plain (1) and Grimbald's Crag (2) ; Saturday, when Mr. Winter accompanied the party, the right bank of the Nidd, below the lower bridge, thence on through Birkham

* Cuckoos arrived in some numbers in the district on April 20th, which is three or four days earlier than usual.

Lycoperdon pyriforme at Knaresborough.

Dwarfed Fir on Plumpton Rocks.

Photos by] [*R. Fortune*

Wood (3) to Plumpton Rocks (4); Monday, the left bank of the river between Knaresborough and the Nidd Viaduct (5), lack of time preventing any examination of the right bank; Tuesday, Birk Crag, Harrogate (6). Along these routes, arachnids were not found to be at all plentiful; April, of course, is too soon for most of them, and the Magnesian Limestone during the first part of the year apparently produces very little depth of ground covering suitable to their needs. Much of the material gathered consisted of immature species, several of which were, however, distinctive enough and sufficiently developed to be recognizable specifically. Only young examples of *Tetragnatha solandrii* Scop., and *Linyphia peltata* Wid., could be obtained by beating bushes and branches of trees, and collecting therefore was mainly confined to situations on the ground. Messrs. King and Corbett each handed in an adult female of *Coelotes atropos* Walck. found beneath decaying bark. Only one spider of comparative rarity was met with, *Styloctetor penicillatus* Westr., ♂'s, which is now known to be less infrequent and more widely distributed than was once supposed. A small black species which conceals itself beneath the bark of trees, it escapes observation, unless specially looked for, except during the mating season, when the males roam openly over the trunks in search of the females. Three spiders, *Lophomma subaequale* Westr., ♀, a rare British species, *Tapinopa longidens* Wid. ♀'s, and *Philodromus dispar* Walck, ♀, a rare Yorkshire species, which I took at Knaresborough in 1906, were not met with on this occasion, but are added to the general list given *in extenso* below, making a total for the district of 56 different kinds. Three species of harvestmen and one false scorpion were also taken. The numbers have reference to the localities enumerated above :—

Spiders.

Harpactes hombergii Scop. 1.
Oonops pulcher Templ. 1, 2, 3, 5.
Clubiona terrestris Westr. 3, 1.
C. reclusa Camb. Imm., 3, 5.
Dictyna uncinata Westr. Imm., 2.
Amaurobius similis Bl. Outhouse.
A. fenestralis Stroem. 1, 2, 3, 5.
Cryphoeca silvicola C. L. Koch., ♀, 3, ♀, 5.
Coelotes atropos Walck. 5.
Tegenaria derhamii Scop.. Outhouse.
Theridion pallens Bl. 2, 3, 5.
Tapinopa longidens Wid. ♀s, 1.
Stemonyphantes lineata Linn. 1, 2, 3, 5.
Linyphia montana Clerck. Imm. and ad. ♂, 3, 5.
L. peltata Wid. Imm. 3, 4, 5.
L. hortensis Sund. ad. ♂s. Imm. ♀, 1, 5.
L. clathrata Sund. 1, 2, 3, 5.
Leptyphantes tenuicola C. L. Koch, 5.
L. zimmermannii Bertk. ♀s., 1, 3.
L. tenuis Bl. ♂s, 5.
L. ericaeus Bl. 5, 6.
Poeciloneta globosa Wid. Imm. 2.
Bathyphantes concolor Wid. 1, 3, 5.
B. nigrinus Westr. 3, 5.
B. gracilis Bl. 3.
B. dorsalis Wid. Imm. 2, 3, 5.
Macrargus rufus Wid. ♀, 5.
Micronetа viaria Bl. 3.
Micryphantes rurestris C. L. K. ♂, 5.

Maso sundevalhi Westr. ♀, 3. ♂, 4.
Œdothorax retusus Westr. ♀s., 3.
Œ. agrestis Bl. ♂, ♀, 5.
Tiso vagans Bl. ♀, 2. ♂, 5.
Erigone atra Bl. 5.
Lophomma subaequale Westr. ♀, 5.
Dicymbium nigrum Bl. 2, 3.
Neriene rubens Bl. 3, 6.
Dismodicus bifrons Bl. Imm. 3, 5.
Diplocephalus cristatus Bl. ♀s, 5.
D. latifrons Camb. 3, 5.
D. fuscipes Bl. 3, 6.
Peponocranium ludicrum Camb. ♀s, 4.
Styloctetor penicillatus Westr. 3.
Walckenaera acuminata Bl. ♀, 2.
Cornicularia cuspidata Bl. ♀, 5.
Ceratinella brevipes Wid. ♂, 6.
Ero furcata Vill. Imm. 2.
Tetragnatha solandrii Scop. Imm. 1, 2, 3, 4, 5.
Pachygnatha degeerii Sund. 1, 2, 3, 5.
P. clerckii Sund. 3.
Meta segmentata Clerck ad ♂s. Imm. ♀s, 3, 5.
M. merianae Scop. Imm. 3.
Xysticus cristatus Clerk. Imm. 5, 6.
Philodromus dispar Walck. ♀, 3.
P. (?) *aureolus* Clerck. Imm. 2.
Lycosa amentata Clerck. Imm. 2, 5.

Harvestmen.

Platybunus corniger Herm. Imm. winter form *triangularis* Herbt. 1, 2, 3, 4, 5.
Megabunus insignis Meade. 3.
Nemastoma lugubre F. Müll. 2, 3, 5.

Pseudoscorpion.

Obisium muscorum Leach, 3, 5.

Geology.—Mr. T. Sheppard reported that the work of the members of the geological section must not be judged by the weight of their knapsacks. From a collector's point of view, perhaps, the Knaresborough area was not an ideal one. But fortunately his party was able to keep well occupied without much manual exertion, though one member at any rate suffered temporary partial disablement in his anxiety to find out 'how the earth was made.' The foundation-stone of the district proved to be the coarse sandstones of the Millstone Grit series; and in one or two localities, as at Plumpton Rocks and even in the stone forming the walls and bridges, were thin beds containing pebbles—some of fairly large dimensions—a thorough examination of which would doubtless assist in solving the problem as to the origin of the material forming the grits. Sorby, many years ago devoted some attention to this question—and more recently it is being followed up by Mr. Gilligan.

At one time the grits formed the land surface in the district now known as Knaresborough, and in one or two places, notably at Grimbald's Crag, the old undulating landscape can be distinctly seen beneath the covering of Magnesian limestone. This Permian stratum rests completely upon and covers up the older rocks and is again in turn covered up by the drift of the Glacial period. But a great break in the geological history of the district has occurred between the deposition of the grits and the limestone which immediately overlies it; just as a

similar gap in the geological record occurs between the limestone and the drift. What was taking place in the Knaresborough area while thousands of feet of strata were being deposited in other parts of the country, it is difficult to say. There is nothing to give any clue.

With the exception of the pebbles already referred to, and a few plant impressions, the Grit yielded but little. The curious way in which they weathered, especially around the lake at Plumpton, was very striking, and enabled the 'false-bedded' structure to be seen quite well. Similarly, the Permian beds were quite barren, and even the characteristic crystal-lined cavities which one member seemed so anxious to investigate, were not to be seen. It was obvious that any organic remains there may have been in these beds had been entirely removed by the various agencies which had been at work in moulding the limestone's present form.

True, in the 'Dropping Well,' which is kept under lock and opened only with the usual silver key, there are 'petrifactions' which might have been carted away by a curiomonger had there been such in the party. But these 'fossilized birds' nests, fossilized boots,' and so on were merely objects coated over by the lime from the super-saturated water forming the well, in recent (in some cases *very* recent) times !

In some way, even the glacial clays and gravels forming the moraines and other conspicuous features in the Nidd Valley, were not very prolific in interesting erratics. Boulders and pebbles of Carboniferous limestone and sandstone—many glacially striated, abounded everywhere ; but the members failed to find a single identifiable igneous rock which would have given some idea of the former direction of the glaciers in the neighbourhood. One specimen certainly might have been had it been properly examined, but the person who endeavoured to chip it was obviously out of practice and hit his hand instead of the stone, calling forth an expression almost Shavian in its brevity, and certainly it resulted in the subsequent proceedings troubling him no more.

But from the configuration and position of these drift beds it was obvious that the great Ice Age had played an important part in the formation of the physical features of the vicinity, as well as in the very course of the River Nidd itself. The nature of these changes, and the appearance of the county and the courses of the streams in pre-glacial times, were problems which suggested themselves after a brief visit—problems which it was hoped would be solved by future workers.

As an instance of the practical application of local materials in early times was an old quern or hand-mill for grinding corn, which was found in a corner of the garden which formed the headquarters of the Union during the week end. This

antique millstone had been made from the local grit and well-used for grinding corn, several centuries before the Millstone Grit received its name. It was interesting to find therefore that in the earliest times the rock which has since become so famous for making mill stones, was used for that very purpose in the place now known as Knaresborough.

And that quern is not at Knaresborough now.

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Early Arrival of Swifts at Harrogate.—The first Swift arrived at Ripley on April 28th, a most abnormally early date. I have never before known Swifts to arrive in this district in April. On May 2nd we had our usual numbers, four days before their regular time. On May 2nd, between Ben Rhydding and Otley, I saw an enormous concourse, consisting of hundreds of Swifts, Swallows and Martins hawking along the banks of the Wharfe. Passing the same way on May 3rd, the Swallows and Martins had all gone, but several hundred Swifts were still there, flying very low down over the river and the road. I seemed to pass through a cloud of Swifts as I drove along the road.—R. Fortune.

Great-Spotted Woodpecker ejecting a Blue-Tit.—A Blue-Tit built her nest in a hole in a tree at Ripley and had laid nine eggs, when a woodpecker came along, enlarged the hole, descended on to the tit's nest, broke all the eggs and turned up the nesting material, and, after this work of destruction she did not use the hole for her own nesting purposes.—R. Fortune.

York Bird Notes.—The following early nests have been found in the district:—Snipe with 4 eggs, April 2nd; Green Plover, one with 4 eggs and one with 3 eggs on March 25th; Pheasant's nest with five eggs on April 16th.

Arrival of Migrants.

Chiff Chaff, April 1st.
Tree Pipit, April 3rd.
Swallow, April 6th.
Willow Warbler, April 13th.
Wood Warbler, April 13th.
Wheatear, April 13th.
Sedge Warbler, April 29th.
Whinchat, April 30th.
Landrail, May 4th.
Swift, May 4th.
Redstart, May 4th.
Common Whitethroat, May 4th.
Sandpiper, April 12th.
Cuckoo, April 16th.
Turtle Dove, April 20th.
Yellow Wagtail, April 21st.
Lesser Whitethroat, April 21st.
House Martin, April 21st.
Garden Warbler, April 27th.
Blackcap Warbler, April 27th.
Spotted Flycatcher, May 5th.
Nightjar, May 6th.
Nightjar, one found dead, May 16th.
Pied Flycatcher, May 16th.

On April 26th, I saw a party of six Fieldfares chasing each other and calling from the top of an ash tree at Wheldrake, 10 miles S.E. of York.—Sydney H. Smith.

Naturalist,

ORCHIS PRAETERMISSA *DRUCE.*

G. CLARIDGE DRUCE.

Field Botanists, with few exceptions, must have at times felt puzzled to put all the forms of the Marsh Orchids they meet with under the two species, *O. latifolia* and *O. incarnata*, since in so many cases plants occur which seem to fit neither species. A distinguished botanist, Mr. C. B. Clarke, read a paper on a plant, which he had found in Hampshire* which he held to be the true *incarnata* of Linnæus and said it ' agrees with Afzelius' specimen collected at the identical spot where Linnæus first collected his *incarnata*, and is marked by the illustrious Fries *O. incarnata* certiss.' I find, however, the lip is not always marked with yellow, but there is a great constancy in the flesh-coloured narrow flowers, the shape of the labellum, and in the strict inflorescence, while the time of flowering usually, if not always, precedes that of its ally. It was obvious that when Mr. C. B. Clarke described this somewhat local form as the true *incarnata* that there must also be a plant or plants passing as *incarnata* which were not the Linnean species, unless indeed, the others, as some doubtless thought, consisted of intermediates or hybrids of *incarnata* and *latifolia*, if indeed *maculata* itself may not have entered into some of the combinations. One of these forms of *incarnata* has been familiar to me for over 20 years, since it occurs not infrequently in my own neighbourhood. A friend of mine, Mr. B. Savile Ogle, who is a very skilful horticulturist found some plants on the borders of Hampshire and Berkshire prior to 1904, and struck by its handsome appearance took it to his garden at Steeple Aston in Oxfordshire, where he successfully grew it. A reproduction from a photograph appeared in the *Report of the Ashmolean Natural History Society* for 1904. The specimen from which it was photographed was 28 inches high. Since then it has broken up into 9 distinct plants, seven of which flowered and have become much shorter. In native habitats it varies from 12-20 inches. Mr. Ogle has succeded in obtaining it from seed and these seedlings are practically identical with the parent and come quite true from the earliest stage, being like each other and the parent. They flower about 10—16 days (as in the native habitats) later than true *incarnata*.

The production of Orchid seedlings is somewhat noteworthy and the fact of them coming true satisfied me that the original plant was not a hybrid, and as I have found it in Northamptonshire, Norfolk, Oxfordshire and Berkshire, there

* *Journ. Linn. Soc.* xix. 206, 1881.

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seemed sufficient evidence in favour of its being a distinct species.

Mr. friend, Mr. P. M. Hall, and his colleague, Mr. R. B. Ullman, who have been with great assiduity studying the Orchidaceæ while at school at Winchester, and have contributed very excellent papers on the subject to the *Report of the Natural History Society* of that College, have been during 1913 specially engaged in examining the various forms of the March Orchis, for which the meadows of Hampshire afford so favourable a hunting ground. Quite independently, they came to the same conclusion that there were two distinct *incarnata*. One of these is the flesh-coloured plant alluded to, the other the subject of this paper.*

I append descriptions of the three species, that of *incarnata* being made rather wider than the definition given by Mr. Clarke, in order to take in the purely flesh-coloured and albino forms, and to conform more closely to the Linnean definition. But there is still another form which is found on the sand-dunes and sea-coasts, which appears also to require definition, but it must await further examination. Yet another occurs on the northern coasts, which may possibly be the northern analogue of *prætermissa*. This species is doubtless widely distributed through the southern and midland areas. It is not unlikely that hybrids of this with *maculata* are sometimes passed as *O. latifolia*, but with this group as with the Helleborines the range of variability is extremely great and will require much patient work, especially in the field and in cultivation before the limits of the three species can be accurately ascertained, or it may be yet other species described. It may be added that hitherto I have been unable to meet with any description or figure which applies to this plant, even the more recent Monograph of the European Orchids, by Camus, failing to supply one.

O. praetermissa Druce. *O. incarnata* auct. et 'Ashmolean Nat. Hist. Soc., Oxfordshire, Report t. l., 1904.' Root two palmate tubers, with long stout rootlets. Stem hollow, 6-18 inches. Leaves normally linear-lanc., narrowing from a broad base to the hooded apex, usually gradually, sometimes unequally, and sometimes somewhat broader in the middle; yellowish green, green or greyish or darker green, unspotted erect or ascending. Bracts often coloured, as long as, or longer than flowers. Flowers conspicuous, of various shades of rose-purple, reddish, or dark crimson purple, in a more or less lax cylindric or conical spike. Lip broad, (as broad as long) flat, more or less distinctly three lobed, the central lobe smaller, and slightly longer, as long or slightly shorter than

*See *Rep. Winch. Coll. Nat. Hist. Soc.* for 1912-3, pp. 8-12, 1913.

the lateral lobe, the sides not reflexed, marked with spots, lines, or blotches of a darker colour, or more rarely in a geometric pattern with defined margins. Viewed from in front the flowers look broad and showy. Upper petals converging into a hood. Upper sepals usually somewhat paler, divaricate. Spur shorter than ovary, curved, cylindric. Flowering usually 10-14 days later than *incarnata*.

O. praetermissa. Foliis fere semper lineare-lanceolatis, a basi lata usque ad apicem cucullatum, plerumque gradatim, interdum inaequaliter contractis, et interdum in medio paulo latioribus; viridibus, flavo-viridibus, cano-viridibus vel e viridi nigricantibus; *sine maculis*, erectis vel ascendentibus. Braceteis saepe coloratis, flori aequantibus vel superantibus. Floribus conspicuis, roseo-purpureo, rubido vel coccineo-purpureo-nigricante colore per varios gradus pictis; spicâ plus minusve latâ, diffusâ, cylindricâ aut conicâ. Labia lata est (8-10 mm.) et aeque longa ac lata, plana, plus minusve perspicue triloba. Loba media minor ets et vel paulo longior vel aeque longo vel paulo brevior quam lobae laterales, *marginibus non reflexis*, et maculis, lineis aut varis nigrioribus, aut, rarius, figurâ geometricâ, cujus margines definiti sont, signatur. A fronte flores lati et clari videntur. Petala superiora convergunt in cucullum; sepala superiora plerumque paulo pallidoira sunt et divaricata. Calcar curvatum, cylindricum, brevius est quam ovarium. Diebus 10-14 postquam *incarnata* floret.

O. latifolia L. Root palmate, not divaricate. Stem, robust, very hollow, 6-24 inches. Leaves, lanceolate, or broadly lanc., broadest in the middle, narrowing from that to the usually obtuse tip, which is usually broad and flat; green, greyish, or bluish green, much spotted, the chocolate coloured spots often circles with the centres of the normal colour. Bracts, as long as, sometimes shorter and sometimes longer, than the flowers. Fl. in rather dense cylindric or conical spikes of usually dark purple, rose purple, or purplish lilac flowers, broader than long, more or less three lobed, usually marked with symmetric lines, the median lobe usually equalling in length the lateral. Upper sepals at first spreading afterwards more or less erect. Spur cylindric or sub-conical, feebly curved, a little shorter than ovary.

O. incarnata L. Stem hollow, 6-18 inches. Leaves normally linear-lanc., narrowed from a broad base to the hooded apex, rarely very slightly broader in the middle; yellowish-green; unspotted; more or less appressed to the stem, erect or ascending. Bracts as long, longer, or sometimes shorter than fls., often coloured. Flowers flesh-coloured, pale dull lilac, rarely white or yellowish, usually in a dense, elliptical or cylindric, obtuse spike. Lip spotted and streaked

with darker markings measuring about 3-4 mm., but when flattened under pressure 6-7 m.m, faintly three-lobed, entire, or sub-entire, the middle lobe when present often a little longer than the lateral one. The flower viewed from the front, owing to the erect upper petals and sepals and the reflexed lateral margins of the lip, looks long and narrow, and is actually smaller than *praetermissa*. Spur conical, blunt, incurved, shorter than ovary.

MOSSES.

***Pterygophyllum lucens* Brid. in West Lancs., and a correction.**—With regard to the note recording the occurrence of Hookeria læte-virens in West Lancs., which appeared on page 129, the specimen has since been submitted to Mr. J. A. Wheldon, who pronounces it to be *Pterygophyllum lucens* Brid.—W. W. Mason.

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GEOLOGY.

***Holaster planus* in the Hessle Chalk.**—During a recent excursion of the Hull Geological Society to Hessle, East Yorks., I obtained a particularly fine specimen of *Holaster planus* from the upper part of the section. This is the first record for the Hessle quarries, and is interesting in so far as it proves the occurrence of the upper chalk in this neighbourhood, according to Rowe's classification. The specimen has been added to the local collection in the Hull Museum.—George Sheppard, Withernsea.

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FISHES.

Record of Sunfish (*Orthagoriscus mola*) in the Humber in 1815.—In Sheahan's 'History of Hull', page 97, is the following account of what is apparently an unusually large Sunfish, which was stranded at Hull in the 16th century. It is probably one of the earliest records of this species that we have for the county. It is not mentioned in Clarke and Roebuck's Vertebrate Fauna of Yorkshire :—'In 1592 after some heavy gales of wind from the south-east, a large fish was driven ashore near Drypool, and excited much admiration. It was almost of an oval shape, six feet long, five feet broad, and six feet between the extreme parts of the upper and lower fins. One of the fins was placed on the back, and the other on the belly, designed perhaps by nature to keep it erect in the water. It was taken to be the *Orthagoriscus parvus gesneri*; and what Pliny calls the little sea-hog.'—T. S.

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A Tylodendron-like Fossil [*T. Cowardii*, from Altrincham]. Mem. and Proc. Manchester Lit. and Phil. Soc., Vol. LVII., Part 3, 1913, No. 18, pp. 1-13.

G. Weyman. Northumberland, Durham.

The Great Whinsill at Kirkwhelpington. Proc. Univ. of Durham Phil. Soc., Vol. V., Part 2, 1913, pp. 63-67.

G. Weyman. See A. R. Dwerryhouse.

F. Wignall. See Paul V. Kelly.

F. Wignall. See M. Stables.

Ethel M. R. Wood. See Gertrude Elles.

E. A. Woodruffe-Peacock. See Peacock, E. A. Woodruffe-.

Henry Woods. Yorks., Lincs.

A Monograph of the Cretaceous Lamellibranchiata of England. Vol. II., Part 9: Ostreidæ, Radioliditæ. Additions, Distribution, Bibliography, Index. Pp. 341-473, Plates LV.-LXII. Rep. Pal. Soc. for 1912, published 1913.

A. Smith Woodward. Westmorland.

Description of the Teeth of Two New Species of Fishes from the Lower Carboniferous Rocks of the North-western Province [Appendix I. to E. J. Garwood's paper; describes *Deltodus garwoodi* and *Cochliodus virgatus* from Ravenstonedale, etc.]. 'Quart. Journ. Geol. Soc.', Vol. LXVIII., Part 4, No. 272, for December 1912 [issued 27th January, 1913], pp. 572-573.

B. B. Woodward. Lancs.

Catalogue of the British Species of Pisidium (Recent and Fossil) in the Collections of the British Museum (Natural History), with Notes on those of Western Europe [includes fossil forms from Lancashire]. London, 1913, pp. x+144 (thirty plates).

B. B. Woodward. See E. H. Mullins.

Henry Woodward. Lancs., S.

Rochdalia Parkeri, **a new Branchiopod Crustacean from the Middle Coal-measures of Sparth, Rochdale.** *Geological Magazine*, August 1913, pp. 352-356.

Horace B. Woodward and Hilda D. Sharpe. Northern Counties.

Photographic Supplement to Stanford's Geological Atlas of Great Britain and Ireland. London, 1913, pp. 1-113.

David Woolacott. Northumberland, Durham.

The Geology of North-East Durham and South-east Northumberland. 'Proc. Geol. Assoc.', Vol. XXIV., Part 2, 1913, pp. 87-107.

DAVID WOOLACOTT. Northumberland, Durham.

Report of an Excursion [of the Geologists' Association] to Sunderland and Tynemouth, Whitsuntide, 24th to 30th May, 1912. Proc. Geol. Assoc., Vol. XXIV., Part 2, 1913, pp. 108-114.

[D.] WOOLACOTT. See A. R. DWERRYHOUSE.

KARL A. VON ZITTEL. Northern Counties.

Textbook of Paleontology [edited by Charles R. Eastman]. Third Edition. Vol. I., 1913, pp. xii+839.

ADDENDA.

ANON. Northern Counties.

Per Rail [with plans of coalfields, etc.]. London, 240 pp., 1913.

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We regret to note the death, at the age of 83, of Professor E. Suess, the geologist.

The Journal of the Board of Agriculture for April contains a short note on 'Millepedes and Centipedes.'

We regret to note the death of Mr. George Sharman, who for many years was Palæontologist to the Geological Survey, at the age of 82.

The Scottish Naturalist for May has an interesting account of some early references to four-horned sheep in Scotland, by Dr. J. Ritchie.

We much regret to record the death of a Past-President of the Yorkshire Naturalists' Union, Mr. Wm. West. F.L.S., of Bradford. A notice will appear in our next issue.

We note the death of Mr. George Bentley Corbin, who, about 1866, conducted the *Amateur Naturalist*, a manuscript magazine dealing chiefly with insect life. We should like to see a copy of this journal.

Mr. C. Crossland, who has been for 30 years an ordinary member of the Halifax Scientific Society, was elected an honorary life member at its recent general meeting. We should like to congratulate Mr. Crossland on the deserved honour.

Besides a record of the field meetings of 1913, by Dr. J. W. Ellis, which is largely botanical, and the annual report for the same year, the *Proceedings of the Liverpool Naturalists' Field Club*, recently issued, contains Part 3 of Dr. Ellis' 'Wirral Fungi,' which deals with the *Ascomycetes*.

The Saga-Book of the Viking Club, Vol. 8, Part 1, has recently been issued, and contains an account of the meetings during 1912. Among the articles is one by Mr. D. Stedman on 'Some Points of Resemblance between Beowulf and the Grettla (or Grettis Saga).' Dr. G. Schütte writes on the 'Cult of Nerthus.' The President (Mr. W. F. Kirby) writes on 'the Voluspa, the Sibyl's Lay in the Edda of Sæmund' Mr. A. W. Taylor on 'St. Bridget, of Sweden,' and Mr. F. P. Marchant, 'The Vikings and the Wends.' Altogether the volume is a most creditable record.

The British Museum (Natural History) has issued a *Report on Cetacea stranded on the British Coast during* 1913, which has been prepared by Dr. S. F. Harmer (12 pp. 1s. 6d.). It apparently contains a record of the whole of the cetacea stranded on the shores of the British Isles during the year, and the various occurrences can be seen at a glance on the three maps which accompany the memoir. The greatest number of records seems to be on the east and south coast of England. The report has some valuable information as to the connection between the cetacea and the sharks to the shoals of herrings, etc. Apparently Lincolnshire and Yorkshire have a fair share of records to their credit. Northumberland and Lancashire have two each.

NEWS FROM THE MAGAZINES, etc.

The New Phytologist for March contains a paper on 'Variability in *Stellaria Graminea*,' by Mr. A. S. Horne, B.Sc.

The Scottish Naturalist for April contains a paper by Mr. S. E. Brock on 'The Display of the Mallard in relation to Pairing.'

An abundance of *Halipus striatus* Sharp, in Yorkshire on the Yorkshire side of the Tees, is recorded in the *Entomologist's Monthly Magazine* for May.

In *British Birds* for April are two remarkably fine coloured plates of heads of the lesser and great Black-Backed Gulls, drawn by Mr. E. Alexander.

In *The Irish Naturalist* for May, Dr. H. Stokes has an interesting account of excavations in Ireland for the purpose of securing remains of the Irish Elk.

In *British Birds* for May is a record of the Spoonbill in Cheshire in November last, and of a number of Black Terns in the same county during April.

In connection with the Filey meeting of the Yorkshire Naturalists' Union the Hull Geological Society has issued an admirable coloured sketch of the cliffs of the Filey district.

According to a note in *The Zoologist* for April, it is evident that in some of the counties, including Northumberland, Cumberland, and Lincolnshire, the numbers of Black Redstarts have been more numerous this year than usual.

In *The Geological Magazine* for May, Dr. R. J. Sherlock contributes the first part of a paper on 'The Foraminifera of the Speeton Clay, Yorkshire,' and Dr. C. A. Matley writes on 'The Source of the Pebbles in the Bunter.'

Knowledge for May contains well illustrated articles 'On Hairs and Hair Pigments,' by H. Onslow; 'The Fairy Shrimp,' by W. Mark Webb; 'Spore Dispersal in the Larger Fungi,' by Somerville Hastings; and 'A microscopical Colloidal Examination of Jams,' by Ernest Marriage.

In *The Lancashire Naturalist* for April, Mr. H. J. Wheldon has an interesting note on the Fungi of the Lancashire Coast; Dr. A. R. Jackson gives notes on collecting and preserving spiders, and Mr. R. Standen has similar information with regard to False Scorpions and Wood Lice.

Dr. Sheridan Delepine has a note in the *Museums Journal* for April, 'On the Arsenious Acid- Glycerin-Gelatin (Arasenious Jelly) Method of Preserving and mounting Pathological Specimens with their natural colours, and on the use of new forms of Receptacles for Keeping Museum Specimens."

From the Horniman Museum, Forest Hill, we have received an admirable little handbook to the collections illustrating a Survey of the Animal Kingdom, which contains 78 pages, and is sold at one penny. It was written by Mr. F. W. Milligan. The Summary of progress of the same Museum, since its opening in 1901, has also appeared, and has one or two very fine illustrations.

We take the following from the May number of the *Entomologist's Monthly Magazine*. "'A humble-bee attacked by a Dipteron." The occurrence recorded under the above heading by Mr. Richardson in the *Entomologist's Monthly Magazine* for last month, page 93, is easily explained. What was taken for "a medium-sized black humble-bee," was really the female of *Podalirius pilipes* Fab., one of the Apidæ; and the supposed Dipteron hovering over it and vibrating its wings in a state of great excitement, was clearly the male of the same species.'

NOTES AND COMMENTS.

JUBILEE NUMBERS.

The *Entomologist's Monthly Magazine* for June is a special Jubilee Number and contains an interesting account of the work of this valuable journal. As a frontispiece are admirable portraits of its past editors, viz., Thomas Blackburn, H. G Knaggs, R. Mclachlan, E. C. Rye, H. T. Stainton, J. W. Douglas, C. G. Barrett and E. Saunders. The following details are given of the additions to the British insect fauna recorded in the magazine between June 1864 and May of the present year:—Coleoptera, 601 species; Diptera, 1121; Euplexoptera, 3; Hemiptera, 166; Homoptera, 317; Hymenoptera, 446; Lepidoptera, 218; Neuroptera, 79; Orthoptera, 3; Siphonaptera, 11; Thysanoptera, 27; Total 2,992 species, which is ample evidence of the many achievements of this well-known magazine.

GEOLOGICAL MAGAZINE.

The June number of this journal is the 600th number, and completes its 50 years' existence. During the whole of that period the editor-in-chief, Dr. Henry Woodward, F.R.S., has conducted practically every issue. Such a record is surely absolutely unique in the history of scientific literature, and we should like to tender to Dr. Woodward our sincere congratulations on the extraordinary success he has achieved. The value of his magazine to geological science is far greater than can possibly be realised, and its unique excellence has been maintained almost entirely through the assiduity of its editor. We should like to extend to him and to his journal every good wish for long life and prosperity. It is interesting to record that of the original contributors to the first volume in 1864, there still remain among us the Rev. Osmund Fisher, Sir Archibald Geikie, Professor W. Boyd Dawkins, and Professor E. Hull, letters from each of whom appear in the 600th number.

MARVELS OF INSECT LIFE.

Under the general editorship of Mr. Edward Step, Messrs. Hutchinson & Co. are issuing a new publication in 24 parts at 7d. each, entitled 'Marvels of Insect Life.' This is profusely illustrated by coloured plates and numerous illustrations in the text, and if subsequent parts keep up the standard of No. 1, it will unquestionably form one of the most popular volumes dealing with insect life. There are enlarged photographs of well-known species, which present a truly fearsome aspect.

ANOTHER NEW YORKSHIRE BIRD.

The current 'Bulletin of the British Ornithologists' Club' (No. CXCVIII.) contains a doubtful record of a new addition to the avifauna of Yorkshire. At the May 13th meeting of

the Club Mr. A. F. Griffith 'exhibited two examples of the Black-headed Bunting, which were believed to have been taken in a wild state in the British Isles. I.—Black-headed Bunting (*Emberiza melanocephala*). An adult male caught in mature plumage near Halifax, December, 1910. James Hamilton, of Hopwood Lane, Halifax, secured the bird and sold it a few days afterwards for five shillings to Major Johnson, of Melrose House, Hove, Sussex. The last-named gentleman kept it alive in his aviaries till the 31st of May, 1912, when it was killed by a "Clodbird" (*Emberiza calandra*). The specimen had been presented to the Booth Museum, Brighton.' The second specimen had also been presented to the Booth Museum. It was reported to have been shot at Battle, Sussex, in April, 1912, and went through a well-known shop in St. Leonard's. It was also a male. We are sorry that our Yorkshire bird should be associated with a Sussex example in this way, as it makes us feel all the more that both are most likely escapes and can hardly be looked upon as satisfactory additions to our avi-fauna.

A NEW SHELL.

In *La Feuille des Jeunes Naturalistes* for May, Colonel H. Martel gives a description of a new mollusc, which in the heading he refers to as *Lacuna* (*Epheria*) *cancavennensis*, whereas under the figure of the specimen he gives the specific name as *Lacuna* (*Ephiria*) *cancavenninsis*. Zoologists will be glad to know which are really the correct names of this new species.

THE CARLISLE-SOLWAY BASIN.

At a recent meeting of the London Geological Society, Prof. J. W. Gregory pointed out that the Carlisle-Solway basin has been generally represented as a syncline, with the Solway resting on a great thickness of Triassic rocks. A boring made near Gretna in 1794 shows, on the contrary, that Lower Carboniferous rocks crop out there at the surface. This boring shows that the basin is not a simple syncline. The evidence derived from the boring necessitates reconsideration of the Permo-Triassic sequence in North Cumberland, as to which the Geological Survey maps and memoirs are not in agreement. According to Mr. Holmes's view, expressed in the memoir, there are two series of Gypseous Shales, one above and the other below the St. Bees Sandstone. According to the classification adopted on the maps, there is only one horizon of Gypseous Shales, which is below the St. Bees Sandstone. Mr. Holmes's case rests on the identification of the rock at the bottom of the Abbeytown boring as St. Bees Sandstone. If that rock be accepted as the Penrith Sandstone, it is unnecessary to assume two series of Gypseous Shales. Argu-

ments are given to show that the evidence for the existence of the St. Bees Sandstone at the bottom of the Abbeytown and Bowness borings is quite inconclusive, and the fact is improbable. The view adopted by the Geological Survey map as the alternative to Mr. Holmes's conclusion, that the area west and north-west of Carlisle consists of Keuper deposits, is also improbable, the rocks thus identified being the Gypseous Shales above the Penrith Sandstone.

ANOTHER IMPORTANT LINK

At the same meeting Dr. A. Smith Woodward read a paper on 'The Lower Jaw of an Anthropoid Ape' (*Dryopithecus*) from the Upper Miocene of Lérida (Spain). He described and discussed the greater part of a mandibular ramus and symphysis of *Dryopithecus fontani*, lent to him by Prof. L. M. Vidal, of Barcelona. The specimen was found in association with the *Hipparion* fauna at Seo de Urgel, in the Province of Lérida (Northern Spain). It is, therefore, the latest jaw of an Anthropoid Ape hitherto discovered in Europe, although probably contemporaneous with the isolated Anthropoid teeth from the Bohnerz of Würtemburg and the well-known Anthropoid femur from the Sands of Eppelsheim (Hesse-Darmstadt). The relatively small size of the first molar is to be regarded as a primitive character, lost in all modern Anthropoids except some Gibbons. The shape of the mandibular symphysis is almost remarkably primitive, with the surface of insertion for the digastric muscle nearly as large as that of the ancestral Macaques (for instance, *Mesopithecus*). The anterior face of the symphysis slopes directly upwards from the front edge of this insertion, as in the Macaques, some Gibbons, and very young individuals of the Chimpanzee, Gorilla, and Orang. It thus differs considerably from the mandibular symphyiss in adult individuals of these existing Apes, in which the lower portion of the slope curves backwards into a more or less well-defined flange or shelf of bone, while the digastric insertion is reduced in extent. The mandibular symphysis of *Dryopithecus* is, indeed, intermediate in shape between that of the Upper Miocene or Lower Pliocene *Mesopithecus* and the Lower Pleistocene *Homo heidelbergensis*. So far as its lower jaw is concerned, *Dryopithecus* is, therefore, a generalized form from which modern Anthropoid Apes and Man may have diverged in two different directions.

SCANDINAVIAN DRIFT OF THE DURHAM COAST.

At another meeting of the same Society, Mr. C. T. Trechmann summarized observations carried out for some time on the superficial deposits of South-East Durham and the lower Tees Valley. Evidence relating to the pre-Glacial levels and

contours of the land in the Permain and Triassic areas had been collected and examined. This supports the conclusion that, immediately prior to the oncoming of glacial conditions, the land stood at not less than 100 feet above its present level. The fissures and depressions of the Middle and Upper Magnesian Limestones on the eastern side of the Shell-Limestone reef have been instrumental in preserving relics of the material brought by the earliest ice-sheet which invaded the district from the North Sea. This material proved to be absolutely devoid of the ordinary glacial erratics of the North of England and Scotland, found in the overlying main Drifts. Several narrow vertical fissures are filled with masses of red sandstone, red, grey, and green marl, peat and masses of peaty wood, and Magnesian Limestone, both of immediately local occurrence and of material strange to the district.

PRE-GLACIAL DEPRESSIONS.

The Scandinavian Drift proper occurs about midway between Hartlepool and Seaham Harbour, and occupies a position near the middle of the stretch of coast-line where the red fissures are seen. It has been preserved in a pre-Glacial depression and fissure in the underlying Magnesian Limestone, extending over slightly under a quarter of a mile. It is represented by a transported shelly clay containing a fauna of Arctic affinities, which recalls that of some of the basement clays of Flamborough and Holderness. Among other erratics a big boulder of titaniferous syenite was found resting immediately upon the Magnesian Limestone near the southern end of this section; special notice was taken also of a very big laurvigite-syenite (5 feet long) and two rather smaller rhomb-porphyries lying on the shore opposite this place. All the stones (between 300 and 400 specimens) found in this clay were collected and examined. The greater part of them are well-glaciated crystalline rocks, many of which (the typical Christiana eruptives) certainly are, and the greater part may be, of South Norwegian origin. Permian limestone, red sandstone, chalk, and splintered flints also occur. The apparent absence of any East Scandinavian rocks in Durham was noticed, and an explanation offered. The early retreat of the Scandinavian ice from the Durham coast, as also its relation to the English and Scottish glaciation, was discussed.

SCOTTISH ROCKS.

Later than the fissure-filling material are certain water-deposited gravels and sands, which occupy shallow depressions underlying the main Drift seen on the coast. They are noticeable for containing a rather large proportion of gneissic and schistose rocks, olivine-basalts, etc., in this case presumably

of Scottish origin. A comparison with a similar bed on the Northumbrian coast, studied by Dr. J. A. Smythe, was made. The main Drifts of South-East Durham were briefly described, more especially in relation to the limits and direction of flow of that part of the ice-stream which carried Cheviot material in the last phase of the maximum glaciation of the east coast. The direct southerly or south-westerly movement of this ice towards the northern face of the Cleveland Hills at this period is indicated by striæ, by the western limits of Cheviot material in this area and in Northumberland, and by the superficial mingling in the lower Tees Valley of the products of this ice with material brought at an earlier period over Stainmoor. The occurrence of Shap Granite and olivine-basalt erratics was indicated on a map. The conspicuous kaimes developed about the village of Sheraton and others, associated with the Cheviot Drift, were described.

YORKSHIRE DRIFT.

In the discussion Mr. G. W. Lamplugh commented on the general interest of the results obtained by the author. There could be no doubt that the material described as Scandinavian Drift was equivalent to the Basement Boulder Clay of Yorkshire, and indicated an early move of the ice-sheet inland from the sea-basin on the Durham coast. The speaker had previously expected that the Pennine and Cheviot ice might have occupied this ground early enough to exclude the eastern ice; but the new evidence proved that such was not the case, and showed more clearly than ever that the ice from the present land-area was subsidiary throughout to the ice from the sea-basin. The succession of glacial events outlined by the author for the country north of the Tees was in close agreement with that indicated by the Drifts of the Yorkshire coast.

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From *The Fourth Annual Report of the Doncaster Municipal Art Gallery and Museum* we learn that progress has been made in the various departments. The late Mr. H. Culpin's collection of coal measure fossil has been sorted and arranged, and a small aquarium has been placed in the entrance hall. The museum seems to be making a strong point of 'by-gones.'

The *Hull Museum* continues to issue its penny publications. Since the last notice in this journal there have been published six *Quarterly Records* containing illustrated accounts of recent additions, which largely deal with folk-lore and early fishing and shipping matters. The guide to the Pickering Museum of Fisheries and Shipping has been reprinted and is now in its third edition. The guides to the Wilberforce and Albion Street Museums have also been revised and reprinted. There is also an excellent record of the Museums Conference at Hull in 1913, containing the curator's extraordinary paper on 'Methods of Collecting.' A List of the Yorkshire Seventeenth Century Tokens in the Museum, and an Anglo-Saxon Cemetery at Hornsea, are also among the recent publications.

FAULTING IN BOULDER CLAY AT DIMLINGTON, E. YORKS.

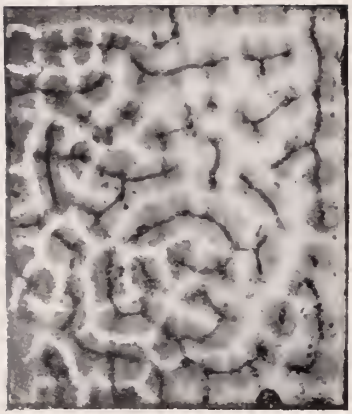
GEORGE SHEPPARD, F.G.S.

WHILE on a visit to the Basement Clay at Dimlington a few weeks ago, my attention was called to an interesting section which appeared in the lower part of the exposure. The clay itself was of the usual dark type, plentifully charged with chalk boulders, many of which had been crushed into

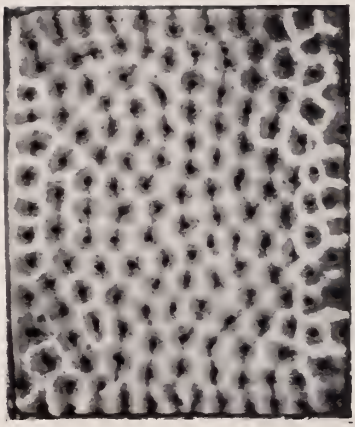
Photo by] [*E. A. Teall.*

Fault in Glacial Drift.

long white bands rendered all the more conspicuous by the black background of the clay. One of these boulders in particular, had been extended to a length of fully fifteen feet, and then it had been secondarily faulted in a distinct manner. The maximum thickness of the chalk layer was six inches, and, as can be seen from the photograph, a typical trough fault had been formed. The major fault, on the right hand side, exhibits a minute fault-breccia along the plane of dislocation. Presumably the faulting would take place while the whole mass was frozen.



VI.



VII.

VIII.

IX.

X.

XI.

Figs. VI. to XI.—Effect of gravity and light on *Euglena viridis*.

MOVEMENTS OF AQUATIC MICRO-ORGANISMS IN RESPONSE TO EXTERNAL FORCES.

HAROLD WAGER, F.R.S.

(PLATE XIX).

(*Continued from page 178*).

I do not suggest that the Euglenæ have any conscious power of choice, but it does seem to me that these and similar experiments with other organisms indicate clearly that the nature of the response to the light must depend upon the protoplasmic constitution of the cell or, as Jennings terms it, its 'physiological state.'

In discussing the effect of light intensity upon the movements of micro-organisms we must consider the effect of light from two different sources upon the direction of locomotion. Loeb states that if two sources of light of equal intensity are at an equal distance from a heliotropic organism, it will move in a direction at right angles to a line connecting the two sources of light, that is, not in the direction of the rays of light, but along a path which is the resultant of the attraction or repulsion exerted by the two sources of light. If, however, the two sources of light are of different intensities the organism is oriented by the stronger of the two. Mast, on the other hand finds that the organisms always move along a resultant path whether the sources of light are equal or unequal. Thus, when the two sources of light were equal (? approximately equal), Euglenæ moved in a general way towards a point very nearly half way between the two sources of light. But when the light was unequal, they moved towards a point nearer the source from which the more intense light came. Mast argues from this that the direction of the rays of light does not absolutely control the direction of motion. But surely the exactly opposite conclusions would be the more correct. If the organisms do actually move along a path which is the resultant of the light acting at the two different sources, it seems to me that this would lend very strong support to the view that it is the direction of the rays of light and not the intensity that is all important.

But my own experimental observations on the movements of Euglenæ and of barnacle larvae under the influence of two sources of light placed at right angles, do not altogether support Mast's results. I find that although the organisms, at the beginning of the experiment move more or less along a resultant path, they ultimately accumulate near the sources of light in numbers which are approximately proportional to the strengths of the two sources of light. Thus, if the lights are of approximately equal intensity they accumulate in

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approximately equal numbers (Fig. XI.). If unequal they accumulate unequally (Fig. X.), and by varying the intensity of one of the sources of light it is found that, although all the Euglenæ at the beginning of the experiment are within the range of the two different sources of light, they are attracted by, and accumulate at, these two sources in such numbers as can only be explained by the fact that they become oriented by the stronger of the two lights falling upon them. That this

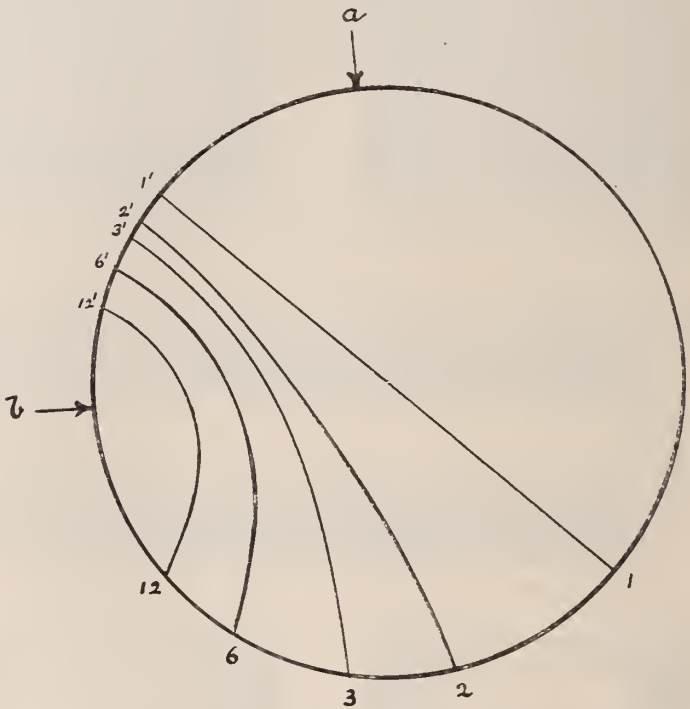

Fig. XII.—When light at *a* is equal to *b*, the region of influence of each is equal, as indicated by 1. If light at *b* remains the same, but that at *a* increases in intensity to 2, 3, 6 or 12 times as much, the region of intensity due to *a* will be correspondingly increased.

must be so can be shown by means of the diagram (Fig. XII.), representing a shallow circular cell in which Euglenæ are, at the beginning of the experiment, evenly distributed and exposed to light from two different sources, *a* and *b*. If the light at *a* is equal to that at *b* (approximately equal), then the line $1—1^1$ marks the neutral region where the intensity of the light from either source is equal. This line divides the circle into two equal halves and it is obvious that if the Euglenæ move

along a resultant path between the two sources of light they will tend to accumulate in the space immediately adjacent to and between the two sources of light. But if the Euglenæ are attracted by a stronger light it is clear that all those upon the *a* side of 1—1¹ will be attracted to *a*, and all those upon the *b* side of 1—1¹ will be attracted to *b*, simply because those on the *a* side are in a region of more intense light as regards *a* than *b*, and those on the *b* side in a region of more intense light as regards *b* than *a*, owing to the operation of the law of inverse squares. The Euglenæ will then accumulate in two equal masses at *a* and *b* as shown in Fig. XI.

Similarly, if the light at *a* is twice as strong as at *b* then the curved line 2—2¹ marks off the area of influence of each; all the Euglenæ on the *a* side of 2—2¹ will move to *a*; all those on the *b* side to *b*. In the same way when the ratio of *a* to *b* is as 3 to 1, or 6 to 1, or 12 to 1, the curved lines 3—3¹, 6—6¹ and 12—12¹ mark off the areas of influence of *a* and *b* respectively, and the Euglenæ will accumulate at *a* and *b* approximately in proportion to these varying light intensities. This explanation does not, of course, apply when the light intensity is so strong at one of the sources as to bring about repulsion; in that case a larger accumulation of Euglenæ would take place at the weaker light.

The nature of the response is very much affected by light of different colours or wave lengths. Thus both Strasburger and Engelmann found that green swarm spores and *Euglena* tend to accumulate at the blue end of the spectrum. In a typical case Engelmann showed that about 70 per cent. of the Euglenæ were attracted by the green-blue part of the spectrum, 11 per cent. by the green, 16 per cent. by the blue-indigo and only 1.4 per cent. by the orange red. My own observations confirm these results. Many contradictory statements have however been made and some observers have maintained that these and similar organisms are more responsive to the green and yellow-green than to the blue. Thus Loeb and Maxwell* find that *Chlamydomonas* gathers in the green part of the spectrum and that the larvae of a barnacle (*Balanus perforatus*) accumulate in maximum density in the green, possibly towards the yellow green.

Experiments which I made with spectra of varying degrees of purity showed that these results, which differ from those of other observers, are probably due to the use of an impure spectrum. The authors state that they tried both prism and

* 'Further Proof of the Identity of Heliotropism in Animals and Plants.' University of California Publications in Physiology, Vol. 3, 1910.

Cf. also Ewald, Jour. Exp. Zoology, 13, 1912, who comes to much the same conclusion as regards the nauplii of *Balanus perforatus*.

grating spectra with the same results, but they do not say whether they used an open slit or a closed one, a pure spectrum or an impure one. There seems to be no doubt that with some organisms, *Daphnia* for example, there is a tendency to accumulate in the yellow and green, but my experiments show both with *Chlamydomonas* and Barnacle larvæ, and also with *Euglena viridis*, that in a pure spectrum produced with a narrow slit, there organisms accumulate in the blue or blue-green, but where the slit is opened and the spectrum become less pure they migrate towards the yellow end and gather in the green or yellow-green portions of the spectrum.

If we cut off the blue end of the spectrum, Euglenæ tend to gather in the green ; if both green and blue are cut off they accumulate in greater density in the yellow and orange ; if yellow and orange are also eliminated, they behave in the red light as in the dark. Similar results are obtained with coloured filters. When we expose Euglenæ to the rays transmitted by red and blue filters respectively, they go to the blue ; red and yellow, they go to the yellow ; yellow and green, they go to both in about equal proportions ; green and blue, they are attracted more by the blue than the green ; blue and violet, they accumulate mainly in the blue.

We have now to inquire how it is that *Euglena* is enabled to respond to the stimulus of light. As we have seen, the locomotion of *Euglena* is brought about by means of a specially developed vibratile organ, the flagellum. The movements of this organ are in all probability set up by chemical or physical changes taking place in the protoplasm of the cell and are ultimately traceable to the release of the stored up energy contained in the protoplasm. They always originate spontaneously within the organism and are only indirectly traceable to external conditions. It is evident therefore that those rays of light which are capable of exerting a material influence upon the direction of locomotion of the cell can only do so by controlling or modifying in some way the mechanism by means of which the movements of the flagellum are brought about. We have already seen that the flagellum arises from the protoplasm at the anterior end of the cell in close relation to the red eye-spot. Immediately in front of, and in close contact with, the inner concave surface of the eye-spot is a bright refractive granule which is borne on the flagellum. We have thus a combination of two structures, a red pigment spot and the flagellum enlargement which may possibly function as a rudimentary light perceiving mechanism, by means of which the light responses of *Euglena* are brought about.*

* Wager. On the Eye-spot and Flagellum in *Euglena viridis*. Jour. Linn. Soc., Vol. 27, 1899.

We have no definite proof that the red pigment spot is a light perceiving organ, but we have some indirect evidence in favour of this view in the fact that in all those chlorophyll-containing unicellular organisms which are very sensitive to light and capable, by means of their flagella or cilia, or responding quickly to changes in its direction or intensity, an eye-spot is present. Those motile cells which do not possess an eye-spot are either not sensitive to light at all, or only to a slight extent. Even in the zoospores of *Chytridium* and *Polyphagus* which are sensitive to light, it is interesting to note that at the base of the flagellum there is a conspicuous orange-coloured oil-globule, which may act in the same way as an eye-spot.

Again, Engelmann has shown for *Euglena* and Strasburger for swarmspores of Algæ, that the rays of light which are most active in their influence upon the movements of these organisms are found in the blue portion of the spectrum, and these are just the rays which are absorbed by the eye-spot.

Further, it has been shown by Engelmann that it is the colourless anterior end of *Euglena* that is sensitive to light. In this colourless anterior end of the cell, both the eye-spot and the apparatus which directly causes the movement of the cell —the flagellum—are placed.

We may fairly conclude therefore that the eye-spot acts as a light absorbing organ, and that the light absorbed is capable in some way or other, not at present understood, of setting up chemical or physical changes in the cell which react either directly upon the flagellum, or through the intermediary protoplasm, so as to bring about a modification of its movements and a consequent change in the direction of locomotion of the cell.

The light responses of numerous micro-organisms are frequently modified by the action of gravity. *Euglena viridis* shows this very clearly. If a tube containing water with a sufficiently large number of Euglenæ to give it a pronounced green colour is placed upright in the dark, the majority of the Euglenæ will in a very short time sink to the bottom, where they form a dark green layer of motile cells moving up and down. A few will be found to have accumulated at the surface of the water where they form a thin green scum.

These upward and downward movements are due to the action of gravity. The organism sinks by its own weight, which is slightly heavier than water, and does not swim downwards by its own choice. It is therefore a purely mechanical response.

It is frequently stated that aquatic micro-organisms do not respond to gravity simply because they are heavier or lighter than water but by reason of some kind of sensibility

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on the part of the organisms which enables them to respond to the gravitational stimulus. Thus it has been found that they may under certain conditions respond to this stimulus by rising to the surface of the liquid (*negative geotaxis*) or by sinking to the bottom (*positive geotaxis*). These terms cannot however be properly applied to the rising and sinking of *Euglena*, for both these movements can be accounted for by the purely mechanical action of gravity in which nothing of the nature of a geotactic response is involved. The downward pull of gravity operates only when the organisms are crowded together and their freedom of movement is in consequence impeded. Under these conditions they sink in the water in a vertical or slightly slanting position, the heavier posterior end being downwards and the fore end, which goes first in voluntary movement, being turned upwards. Euglenæ killed in the expanded condition by hot water or osmic acid take the same position when sinking in water.

The upward movement is also brought about by the mechanical action of gravity. If, for example, Euglenæ which are swimming in a horizontal position towards the light are suddenly shaded, the forward movement is slowed and they immediately swerve, under the influence of gravity, into a vertical or nearly vertical position with their posterior ends downwards. In this position they will be obliged to move upwards, unless their freedom of movement is impeded by overcrowding. So long as Euglenæ are able to move freely in the water, the action of gravity has very little effect upon them, but if their movements are interfered with in any way, gravity at once begins to act.

Combined movements due to light and gravity can be frequently observed. If a shallow vessel containing Euglenæ is placed in an oblique light, the Euglenæ rise through the water towards the source of light and form a green film on the surface of the water. This film is at first homogeneous, but in a very short time it becomes broken up into ripple-like aggregations which move slowly across the surface of the water towards the light. These ripples are due to the action of gravity. The Euglenæ at the beginning of the experiment were more or less evenly distributed in the water, but as the light attracts them more and more towards the side of the dish, they become more and more crowded until at last they become so densely aggregated that their freedom of movement is impeded and gravity at once begins to act, the surface film becomes broken up and streams of Euglenæ sinking downwards may be observed. As the cells become clustered on the side of the vessel nearest the light, they form a dense layer in the form of a green line at the edge of the water. From this green layer streams of cells may be seen descending

into the liquid and gradually becoming disseminated through it. Being thus brought out of the shadow of the mass of Euglenæ at the edge of the water and into the path of the light rays, they begin to ascend again and to seek the illuminated side of the vessel. A continuous circulation is thus kept up and the Euglenæ are prevented from too dense an aggregation which would interfere with their assimulating and respiratory functions. If the vessel is shaded by the hand or by a sheet of card, the downward movement becomes more decided, the Euglenæ disappear from the surface and the upper layer of the water becomes clear. If the vessel is kept in the dark the Euglenæ remain in constant movement and become disseminated through the liquid in the form of an irregular network (Fig. VI.), or under certain conditions may become aggregated into evenly spaced circular groups each with a dark-green central spot (Fig. VII.). In a narrow tube placed horizontally in the dark a similar aggregation takes place, and the Euglenæ form a series of vertical bands (Fig. IX. as seen from the side, Fig. VIII. from above). Under a low power of the microscope each band or group is seen to consist of a central dark mass of cells sinking with their hinder ends downwards; the lighter coloured peripheral area consists of cells swimming upwards. These regular groupings and the cyclic up and down movements are apparently controlled mechanically by the action of gravity and cohesive or molecular forces.

'The upward movement which always regularly follows the downward one is caused by the active movements of the organisms themselves. As soon as the congested streaming mass of cells approaches the bottom of the vessel, it begins to spread out and the Euglenæ becomes diffused in the water. The crowding becomes diminished and the result is that the Eulgenæ are now once more free to move. But they are still too crowded for entire freedom of motion; their axial orientation is still more or less vertical with the anterior ends upwards; consequently they are compelled to move upwards. That they are not able to move in any other direction is due to the action of gravity. Freedom of motion in all directions is only possible when the Euglenæ are few in number and more or less isolated from each other; The force of gravity always tends to bring them into a vertical position and anything which impedes, even to a slight degree, their movements allows this action of gravity to be brought into play.'*

In the dark the movements of Euglenæ are apparently controlled by gravity alone; in a bright light the action of

* Wager, 'On the Effect of Gravity upon the Movements and Aggregation of *Euglena viridis*, Ehrb. and other Micro-organisms.' *Phil. Trans.* B., vol. 201, 1911.

gravity is negligible and the organisms swim towards the light, even when crowded together and this in deep water, such as that in a pond. If the light be cut off or much diminished, gravity acts once more and they sink. This explains the sudden clearing of a pond when a cloud passes over the sun.

All these varied movements, due to the action of both light and gravity, are of great benefit to *Euglena*. As we have seen, *Euglena* obtains its food either through its chlorophyll, as in a green plant, or as a saprophyte by the absorption of organic material. For carbon fixation frequent insolation at the surface of the water is obviously important but the clustering of the motile cells at the surface must not be dense nor long continued. If it were, the organisms would obstruct one another, assimilation and respiration would be hindered and the organic food in the lower depths of the pool would be insufficiently utilised. The action of gravity obviates such disadvantages by causing densely clustered cells to sink and setting up a continuous circulation of the organisms, which are induced to move steadily from the depths to the well-lit surface and then from the surface to the depths.*

—:o:—

FLOWERING PLANTS.

Re-discovery of an Uncommon Sedge in the East Riding.—It will be interesting to students of topographical botany to note that on the 29th May last, a rather uncommon sedge, *Carex axillaris* Good, was found by the writer, growing in a fairly large tussock on the bank of the Skidby Drain near the Beverley Road, about two-and-a-half miles from Hull. The plant was just in the flowering stage, but Mr. A. Bennett, to whom specimens have been submitted, has no doubt about its identity. The first record of *C. axillaris* for the neighbourhood of Beverley, was made by the late Robert Teesdale, to whom plants were shown by the late Colonel Machell, circa 1790 A.D. In 'The Flora of the E.R. Yorks' (1902), where this fact is mentioned with the 'fide' of R. T[eesdale], it is stated that no confirmation had been made of late, but the semi-prophetic words which follow—'it may still be present'—have now had fulfilment. One would be glad to learn of similar confirmation of good, old observers' records still in doubt, such as those of *Carex elongata* (Langwith) and *C. filiformis* (marshes, Beverley), as has recently been done for *Carex pseudo-cyperus* (near Meaux).—J. F. Robinson.

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* Wager, 'The Action of Gravity upon the Movements of an Aquatic Micro-organism.' *Science Progress*, Vol. 6, 1911.

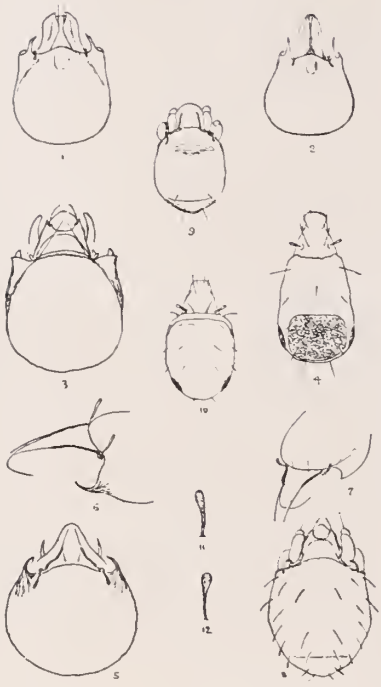

PLATE A.

1. *Oribates redux* sp. n.
2. *Oribates hasticeps* sp. n.
3. *Oribates montivagus* sp. n.
4. Do. nymph.
5. *Oribates rastratus* sp. n.
6. Do. do.
7. *Oribates lucifer* sp. n.
8. *Oribates stagnatilis* sp. n.
9. Do. do. nymph.
10. *Oribates picipes* Koch, nymph.
11. *Oribates stagnatilis*, pseudostigmatic organ, from the front.
12. *Oribates mollicomus*, pseudostigmatic organ, from the front.

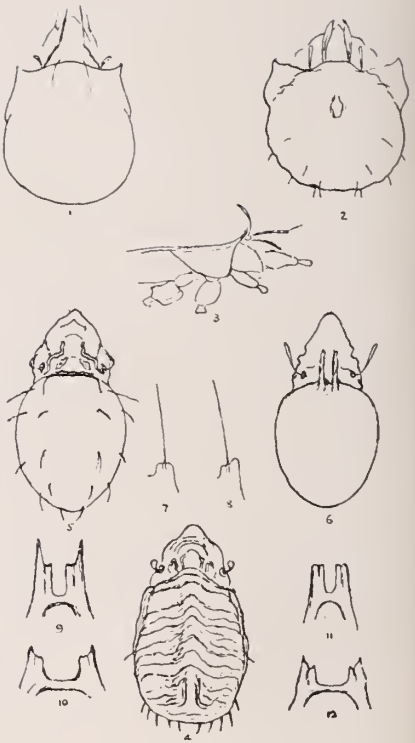

PLATE B.

1. *Oribates dominæ* sp. n.
2. *Pelops major* sp. n.
3. *Oribates michaelii* (nov. nom. for *Oribates lucasii* Nic.—Mich.).
4. *Scutovertex pseudomaculatus* var. *insularis* (sp. et var. nov.).
5. *Damæosoma formosum* sp. n.
6. *Damæosoma vetula* sp. n.
7. *Lamellar cusps, Oribates orbicularis* Koch.
8. *Lamellar cusps, O. piriformis* Nic.
9. Do. *O. setosus* Koch.
10. Do. *O. picipes* Koch.
11. Do. *O. fuscipes* Koch.
12. Do. *O. montivagus* sp. n.

BRITISH ORIBATIDÆ:
NOTES ON NEW AND CRITICAL SPECIES.

Rev. J. E. HULL.

(PLATE XX.).

In the following notes I follow, almost of necessity, the order of Michael's classical treatise on the 'British Oribatidæ' (Ray Society, 1883 and 1887), which is also the order adopted in his later work on the Oribatidæ generally ('Das Tierreich,' 1900). I think, however, that it will be found necessary to drop his primary sub-division of the family into two sub-families based on the presence or absence of pteromorphæ; for it creates an unnatural gap between his Oribatinæ and Notaspidinæ. These are in reality so closely related that the species known to Michael as *Oribates lucasii** is most probably not an *Oribates* at all, but belongs to a group included by him in the genus *Notaspis*, but now commonly regarded as a separate genus (Oribatula). But I hope to deal with this matter of classification elsewhere; at present it will suffice to say that I have found it necessary to adopt several genera proposed by continental authors (mainly sub-divisions of Michael's *Notaspis*).

The number of British species known to Michael in 1900 was 103. In 1905, Messrs. Pearce and Warburton added ten more, of which seven were new species; and *Lohmannia paradoxa* has been recorded for Ireland, making a total of 114. For some time I have been accumulating additions but have only published two, *Oribates picipes* and *Hermannia fluviatilis*. The British list, therefore, at present includes 116 species, and to these I am now adding 22, of which four are already known on the Continent and 18 are, so far as I can ascertain, new to science.

PELOPS Koch.

P. MAJOR sp. n. (Plate B [Plate XX.], fig. 2).

Length about 1 mm.

Of the same general form as *P. acromius*, but the dorsum is not so coarsely rugose, and the 'clear spot' is a little further back. It is most readily distinguished by the dorsal setæ which are all fine and acute. There are two rows of three on the hind margin, and, I think, four rows of three on the disk; but these appear to be very caducous (though the humeral pair are always present). The quadrate prodorsal extension is straight in front and quite flat, of same texture and colour as the dorsum—as are also the pteromorphæ.

* See Plate B, fig. 3.

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The pseudostigmatic organs are rod-like, evenly but very slightly enlarged towards the extremity which is blunt and rounded.

A few specimens only were sent to me by Mr. R. S. Bagnall from Holywell Dene, near the Northumbrian coast.

PELOPTULUS Berlese.

A genus (type *phæonotus*) established for the section of *Pelops* in which the quadrate median prodorsal projection is lacking and the interlamellar setæ are of the ordinary Oribatine type.

P. MONTANUS, sp. n. (Plate C, fig. 3).

Length about 530 μ.

Cephalothorax similar to that of *phæonotus*, but the lamellæ are tridentate on the fore margin. The lamellar setæ are short, stout and divergent, crossed by similar (but longer) convergent setæ of the first tectopedia.

The pteromorphæ also resemble those of *phæonotus*, but they are visibly connected in front of the dorsum by a narrow extension, as in *Pelops*, but of course without the quadrate projection in the middle.

Dorsum of the abdomen coated with dark brown secretion except a pear-shaped 'clear spot'. It bears four rows (3.2—2.3) of fine hairs, and one pair of convergent thickened hairs on the posterior margin.

Ninebanks, West Allendale, in sphagnum; at 1,200 feet. Also at Holywell Dene (sub-maritime) in moss. Plate C, fig. 13, represents a Peloptine nymph which is most probably of this species.

ORIBATES Latr. (emend. Koch).

O. sp., nymph. (Plate C, fig. 14).

This is a nymph which I have twice taken in West Allendale—once in sphagnum, once in ground moss—but have not succeeded in rearing. It seems to be of the *O. sphagni* type, but is twice as as large. There are two spines on each side of the middle line of the dorsum—not a median row of two, as shown in the figure. For reference, this nymph may bear the provisional name of *O. invitus*.

O. STAGNATILIS, sp. n. (Plate A [Plate XX.], figs. 8, 9, 11).

Length about 720 μ.

Lamellæ upright behind, oblique and concave in front: terminal seta springing from an angular notch just below the acute cusp, short and serrate. Translamella nearly horizontal. Interlamellar setæ upright below, slightly curving forward above, serrate. Pseudostigmatic setæ long, slender, recurved, flattened distally, and widening evenly to the truncate extremity. Tectopedia large, the second unusually prominent.

Dorsum dull black, of the same texture as in *mollicomus* and *edwardsii*, with which the present species is nearly allied: pteromorphæ of the same texture, long but narrow. Disk of dorsum flattened; prodorsal spot indistinct. Dorsal hairs in four series, fine, rigid, acute. There is a straight transverse fold, like a scratch, in the dorsal integument, just above the posterior margin.

West Allendale in sphagnum. I have not seen it below 1,200 feet. The nymph is similar to those of the two allied species, and might easily be mistaken for an adult creature, the integument being greenish brown and partly chitinized. There are also traces of lamellæ on the cephalothorax. The dorsal plate is extended laterally so as to cover wholly the two posterior pairs of legs which are thus quite invisible from above.

O. ORBICULARIS Koch. (Plate B, fig. 7).

O. PIRIFORMIS Nic. (Plate B, fig. 8).

O. PICIPES Koch. (Plate B, fig. 10; Plate A, fig. 10).

O. OBLONGUS L. Koch.

O. MONTIVAGUS sp. n. (Plate A, fig. 3; Plate B, fig. 12).

O. SETOSUS Koch. (Plate B, fig. 9).

O. FUSCIPES Koch. (Plate B, fig. 11.)

These form a closely connected series characterized in the adult creature by well developed lamellæ and translamella, short bluntly clavate pseudostigmatic organs, and abdominal integument reticulate with very fine shallow furrows (the meshes usually minutely punctate), but always smooth and shining. They are similarly linked together by common characters in the immature state. The nymphs vary to some extent in the form of the abdomen, but there is always a dorsal scutum (of the same texture as in the adult but less chitinized), covering more or less of the abdomen. (Plate C, figs. 4, 10; the scutum in fig. 10 is left unshaded, and covers the whole dorsum except a very narrow band in front).

The names cited above from Koch and Nicolet have not always been used in the same sense by different authors. I have tried to square my identifications with the figures and descriptions of the original authors, and add a table to make clear in what sense the names are here used.

1.	Sinus of translamella narrower than deep ..	2.
	Do. do. as wide as deep, or wider	3.
2.	Cusps of lamellæ acute	setosus.
	Do. do. truncate	fuscipes.
3.	Dorsum bearing 4 series of setose hairs ..	6.
	Do. without hairs	4.
4.	Dorsum with submarginal fold in front ..	montivagus.
	Do. without any such fold	5.

5. Cusp of lamellæ projecting beyond base of lam. seta		piriformis.
Do. do. not so projecting		orbicularis.
6. Translamella as broad as the cusp of lamella ..		picipes.
Do. much narrower than cusp of lamella		oblongus.

I have considerable doubt as to *piriformis* and *orbicularis*. In the form of the abdomen my species agree with Nicolet's figures and the respective trivial names based on this character. But Nicolet, in describing his *piriformis*, says that the lamella terminates in an acute angle. If he is using the term 'acute' absolutely, of a sharp point, then my identification is wrong, and there is a species which I have never seen, with piriform abdomen and pointed cusp. But Nicolet does not draw a pointed cusp in his figure (which is however, not a very helpful one in this respect), and I imagine he uses the word 'acute' in a relative sense, his object being to distinguish between *orbicularis* and *piriformis*. It is at any rate quite certain that the abdomen of my *piriformis* is piriform, agreeing with the outline of Nicolet's figure exactly. Michael (Brit. Oribatidæ) says of *piriformis*, 'corner of the cusp outside the hair sharp-angled or pointed,' but shews no points or angles in any of his figures. He says the cusp of *orbicularis* is 'truncated.' I give figures to make it quite clear in what sense the two specific names are here used by me.

Following Kulczynski I give the name *picipes* Koch to the commonest of all British forms in this group. Michael, without doubt, ascribing a wide variation to *setosus* Koch, included the much commoner form under that species. His figure gives a faithful representation of the cephalothorax of *setosus* and the abdomen of *picipes*. He even makes *notatus* Thor. a synonym of *setosus*, though (among other differences) Thorell's species lacks the translamellar cusp—the acute point on the inside of the lamellar seta. *Oblongus* L. Koch (like *notatus* Thor., an arctic species) is much nearer to *picipes*, but has a narrower translamella, more slender pseudostigmatic organs, and the fore margin of the pteromorpha slanting slightly backwards instead of forwards. I have just recently met with Northumbrian specimens which I think are really *oblongus* L. Koch. If this determination be correct then there is a further difference in the dorsal integument—each mesh of the reticulation bears from 5 to 8 very visible punctures: also the dorsal hairs are shorter, though their arrangement and character seem much the same.

I append a description of *montivagus*.

O. MONTIVAGUS sp. n. (Plate A, fig. 3, 4; Plate B, fig. 12).

Length about 700 .

Colour a very dark vinous brown, without any prodorsal spot; surface of the dorsal plate rather dull, minutely reticulate (diameter of mesh about 12 μ).

Abdomen broad oval, wide behind. Pteromorphæ normal, but their thickened fore margins are joined by a median extension in the form of a narrow lunette, separated from the dorsum by a transverse fold. This and the pteromorphæ are of a slightly yellower hue than the dorsum. Dorsal hairs none.

Lamellæ nearly upright behind, extremely oblique in front, conforming pretty nearly with the very slight inclination of the translamella. Projecting limb broad, concave, forming two acute cusps with an angular notch between from which springs the terminal seta. The setæ are serrate, curving inwards beyond the rostrum. The interlamellar setæ are also convergent but straight, serrate, sloping forwards and meeting beyond the cusps of the lamellæ. Tectopedia very large and prominent.

West Allendale, Northumberland; Derwent Valley, Durham. Very like *picipes* in general appearance, but easily distinguished by the absence of the prodorsal spot and the lack of dorsal hairs. Like *picipes* it is fond of ascending into shrubs.

O. OVALIS Koch.
O. NITENS Nic.
O. QUADRICORNUTUS Mich.
O. TECTUS Mich.
O. HASTICEPS sp. n. (Plate A, fig. 2).
O. REDUX sp. n. (Plate A, fig. 1).

This is another group of closely related forms. *Quadricornutus* may be separated at once by its bifurcate lamellæ and the conspicuously plumose setæ of the cephalothorax; moreover, like *tectus*, it has no triangular lobe on the fore margin of the pteromorphæ. This lobe is present in all the others and separates them from all other British members of the genus. Of these four, *ovalis* is by far the most abundant. It varies in size from 400 to 700 μ, always retaining however, its distinctive barrel-shaped abdomen, dull, densely punctate cuticle, and characteristic dorsal hairs. The first and last of these characters it shares with *nitens*; and as the sole remaining difference between these two is merely a matter of texture, *nitens* must rank as a variety of *ovalis*. The two other forms are here described.

O. HASTICEPS sp. n. (Plate A, fig. 2).

Length from 400 to 500 μ.

Colour very dark purple brown, polished but rather dull, with a yellow oblong prodorsal spot. Abdomen orbicular. Prodorsal margin running to an obtuse point in the middle,

and bounded on either side by a long narrow very acute process of the pteromorpha, half the length of the cephalothorax. This process tapers evenly to the extremity, and is not deflected; the front margin of the pteromorphæ beyond it is on a level with the median point of the prodorsum. Dorsal hairs none.

Lamellæ pale brown, triangular, very long and narrow, horizontal, inner margins contiguous except at the very extremity where they are slightly divergent; outer margins also quite straight with a thickened rim. A serrate seta projects from beneath the extremity; the pair of setæ are thus close together, projecting half their visible length beyond the rostrum. Rostral hairs incurved, running parallel to the sides of the rostrum. Interlamellar setæ none.

In moss and under stones in grassy places, West Allendale and Cullercoats.

O. REDUX sp. n. (Plate A, fig. 1).

Length about 520 μ.

Dorsum black brown; quite smooth but not very glossy, with a clearly outlined yellow spot in front; outline oval, dorsal hairs none. Pteromorphæ extending beyond the middle of the dorsum. The prodorsal margin is evenly curved, not running forward to a point as in *ovalis* and *hasticeps*; the front margin of the pteromorphæ (the lobe excluded) is on a level with it. Lobe of the pteromorpha not deflected, its extremity obliquely truncate.

Lamellæ yellowish, broad, horizontal, enclosing an equilateral space, fore margins concave, forming with the doubly curved lateral margins acute inward-pointing cusps.

I should have taken this to be the *ovalis* of Nicolet (*non* Koch!), only in that species the lamellæ are said to be inclined at an angle of 45 degrees, and the fore margin of the dorsum is figured of the same form as that of *ovalis* Koch.

It has occurred at Wooler; Ninebanks, West Allendale; and elsewhere in Northumberland, but never very freely.

(*To be continued*). p.110

Wild Flowers, by **Macgregor Skene, B.Sc.** T. C. and E. C. Jack, pp. 92. 6d. net. The object of this little volume of 'The People's Books' series is to enable beginners to identify some of the commoner wild flowers likely to be met with in a country walk. A brief introduction gives an explanation of the more useful descriptive terms, and is followed by ten chapters dealing with 200 species which are grouped according to the colours of the flowers—white, yellow, red, purple, blue, brown, green, etc., and each group is further sub-divided according to leaf shape, inflorescence and flower characters. The descriptions of the species are very simply worded and identification is further aided by an illustration of each species. The figures are evidently from the well-known 'Illustrations of the British Flora,' by Fitch and Smith.

Photos by] Filey Brig. [*A. H. Robinson.*

YORKSHIRE NATURALISTS AT FILEY.

(PLATE XXI.).

THAT historic Filey is an attractive place for one of the Union's excursions was well evidenced by the excellent attendance of members, forty in number, who sojourned there over the week-end, devoting the Whitsuntide recess to the investigation of the natural history of the neighbourhood. Eleven years have passed since the Union paid its last visit to this pretty coastal resort, and by singular coincidence on exactly the same dates. That occasion marked a record for the Monday's excursion, which still remains unbeaten. On the present occasion there was a good influx of members on the Monday, but somehow the majority failed to appreciate the fact that provision had been made for a tea at headquarters.

There is an attractiveness about Filey which appeals to the nature lover; excellent working ground for all tastes; quietude; and scenic beauty.

Officially representation was good, there being present the President, Mr. Thomas Sheppard, Mr. Harold Wager and Mr. G. T. Porritt (Past Presidents), Miss Johnstone, Mr. J. J. Burton, Mr. J. W. Stather, and the Secretaries.

On Saturday morning all parties met at the seaward end of the Ravine. The geologists, under the guidance of Mr. J. W. Stather and the president, devoted their time to an examination of the famous rock mass known as the 'Brig.' The fossiliferous beds which belong to the upper part of the lower calcareous grit received much attention. The boulders were especially worthy of study. An examination was also made of the caves in the headland of Carr Naze, locally called the 'Doodles,' and a visit was paid to the site of what is believed to be the old Roman Lighthouse, the 'kitchen middens' in its immediate vicinity, and what now remains of the old Spa Well which brought Filey into vogue as a fashionable resort close upon a century ago. The botanists, guided by Mr. J. F. Robinson, spent their time in the lower part of the Primrose Valley, and along the undercliff close by.

On Sunday a large party paid a visit to the wold country. The route taken was through Muston to Flixton, at which place an examination was made of an interesting section showing the junction of the Lower and Middle Chalk. Proceeding up the hill an excellent view was obtained of the Vale of Pickering, the glacial features of which were explained by Mr. Stather. Dr. Woodhead pointed out the vegetation features relative to the peculiar topography of the area traversed. One of the most striking features was the special type of vegetation of the dry valleys, which are themselves very curiously shaped, having distinct slopes, and dry bottoms,

usually uncultivated. The ground is covered by calcareous pasture, frequently disturbed by moles and rabbits, which bring to the surface fine, brown soil mixed with innumerable flints and fragments of chalk. The soil thus prepared acquires a new and conspicuous vegetation. In place of the close cropped pasture with its characteristic limestone species, the areas are inhabited by golden crosswort, along with the taller growing nettle, burdock and cleavers, while the ground ivy, creeping buttercup, field and germander speedwells also occurred. In parts the Scotch Pine has been planted, but is far from healthy, and considerable parts of the slopes are covered with gorse. The common Ash grows well, and along with the Hawthorn, both of which seed freely, form in places an open woodland.

On Monday the geologists spent their time in an examination of the cliffs between Carr Naze and Gristhorpe Bay, where the celebrated fossil plant-bed received considerable attention. The botanists spent a profitable time southward, in the Primrose Valley, and along the cliffs beyond, where the numerous ponds amply repaid investigation.

The Marine Biology Committee was represented by its President, Dr. Irving, and its Secretary, Rev. F. H. Woods. The workers in this section spent the day examining the Brig, with good results.

The general meeting on Monday brought to a close a most successful gathering. Many excellent sectional reports were given, and hearty thanks accorded to Mr. J. W. Stather for his services as divisional Secretary.

Reference was made to the loss which the Union had sustained in the death of the late William West, F.L.S., of Bradford, a past President of the Union. A vote of condolence with the members of his family, and relatives, was moved from the chair, supported by Mr. Porritt and Mr. Wager, and carried.

The evening gatherings were a pronounced success, and the four lectures delivered were extremely interesting.

The President gave a characteristic address upon 'The early history of Filey,' in which the salient features of Filey's past were blended with humorous comments. Mr. Sheppard stated that like other resorts along the Yorkshire coast the popularity of Filey is supposed to date from the discovery of its Spa Well, the site of which still remains. Mr. Sheppard's address will appear at length in *The Naturalist*. Additional interest was added to the address by the exhibit of a large collection of old prints, photographs, and books, dating a century back, relating to the early history of Filey.

Dr. Woodhead's address was upon 'Some problems of shore plants.' After indicating the special features which

characterise shore plants, he developed a number of points which were at present receiving a considerable amount of study. He remarked that an examination of the cliffs in the immediate vicinity of Filey showed a paucity of true maritime plants. The reason was that at every high tide the waves beat against the cliff base, and the foreshore is so continually disturbed, that it is impossible for strand species to obtain a foothold. Further, the cliffs themselves are readily denuded, and although influenced by sea spray, yet very few typical maritime species occur. The plants which do obtain a good foothold on the cliffs are those which have a good anchoring and fibrous rooted system, and good seed dispersal mechanism, as for instance, the coltsfoot, which was a most conspicious plant along the cliffs, practically dominating certain areas. The determining factors of different soils, the influence of salt, the structural peculiarities, transpiration, and radiation of the plants of the shore and cliffs, were exceedingly well developed. Finally, Dr. Woodhead summarised the plant-life of the shingle beach, describing the various succession of plants which occur, and explaining in detail the wonderful adaptability of the Sea Blite to the movements of shingle by wave action, and how useful the whole plant community was in building up permanent sea walls.

Mr. J. W. Stather gave a delightful address upon ' Some of the Geological problems of the Filey District,' in which he summarised the progress made, and the notable work done by Yorkshire geologists along the coast line of their county, especially in the neighbourhood of Filey. The work of the Union's Boulder Committee by diligent working among the numerous erratics along the Yorkshire Coast was particularly emphasised. The height of the County's coast-line during the Ice Age, and the various fossiliferous deposits in evidence, were likewise ably dealt with. In conclusion Mr. Stather briefly alluded to his endeavours to trace the former outlet of the drainage of the Filey District. A boring made by the Filey Council near the station for water had disclosed the position of the old river channel, which must have been the present Filey Ravine, or very close to it. An exhibition of maps and diagrams added much to Mr. Stather's address.

The Rev. F. H. Woods gave a chatty account of the Marine Biology of Filey. After speaking upon the wonderful range of beautiful microscopic shells which could be obtained from the drift along the coast-line, he dealt at length with the three species of Chiton which occur. He also gave some interesting facts regarding the growth of the Limpet, pointing out that although so well-known from its cap-like form, yet its development was from a form similar to that of the Whelk. Mr. Woods brought for exhibition a large collection of microscopic shells,

as well as specimens of the Chitons referred to in his lecture, and also explained his methods of collecting and preserving specimens.—W.E.L.W.

Botany.—Mr. J. F. Robinson writes:—The botanical contingents did excellent observational work on both Saturday and Monday along the coast southward of Filey. 'Primrose Valley,' a quite considerable ravine which bifurcates inland at a few hundred yards' distance from the sea-shore, is cut into the Boulder Clay, the steeply sloping sides being well covered with a very varied vegetation. Here the botanists lingered long and had a good time before moving half-a-mile further on to the 'Flat Cliff' a form of undercliff caused by the slipping of the Boulder Clay. The grassy undulations of the 'Flat Cliff' and the numerous ponds in the hollows thereof proved particularly interesting. In both places the assemblage of plant forms was of a very mixed character; and although from the similar geological characters of the two, many species were common to both, yet each had its own characteristic association. For example, 'Primrose Valley'—a rather unfortunate local name; 'ravine' would be better—alone showed such species as *Viola hirta*, *Polygala serpyllacea*, *Lychnis dioica*, *Hypericum pulchrum*, *Geranium sanguineum* (profuse), *Trifolium medium*, *Lathyrus montanus*, *Spiræa Filipendula*—quite the most abundant and luxuriant growth that one has yet seen anywhere of this species—*Agrimonia Eupatoria*, *Poterium Sanguisorba* and *Rosa pimpinellifolia* in one of its few stations in East Yorkshire. *Epilobium hirsutum* and *Sium erectum* grew respectively near or in the beck. On the slopes of the ravine, or in damp depressions thereof, were found *Arctium minus*, *Serratula tinctoria*, *Centaurea nigra*, *Hieracium pilosella*, *Fraxinus excelsior*—poor looking specimens for ash trees and all terribly infested by the ash canker—*Scrophularia aquatica*, *Stachys Betonica*, *Ajuga reptans*, occasionally with beautiful rose-purple flowers instead of the usual steel-blue ones, *Habenaria viridis*, *Scilla festalis*, several sedges including *Carex disticha*, *C. flacca* and *C. acutiformis* with the two grasses *Bromus giganteus* and *Brachypodium gracile*. Two cryptogams *Pteris aquilina* (bracken) and the great Horsetail, *Equisetum maximum* may conclude an interesting but by no means exhaustive vegetal list of Primrose Valley.

The plants of the Flat Cliff might be said to constitute one, or more correctly perhaps two, very full associations, including as it did such species as follow:—

Ranunculus Drouetii, *R. heterophyllus*, *R. Flammula*, and in one pond now nearly dried up, *Ranunculus Lingua* (the first record for the locality of this fast diminishing species). To these may be added *Hypericum quadratum*, *Ulex europæus*, *Prunus spinosa*—both of the last two species being low and

almost cushion like—*Spiræa Ulmaria*, a Rubus of the *Cæsii* group with remarkably large and lacerated white petals, *Potentilla sylvestris*, *Hydrocotyle vulgaris*, *Apium inundatum* (also a first record for one of the ponds of the Flat Cliff), *Œnanthe fistulosa*, *Silaus flavescens*, *Valeriana dioica*, *Eupatorium cannabinum* with *Spiræa Ulmaria* in big, dense beds, *Pulicaria dysenterica*, *Tussilago Farfara*—the first plant apparently to establish itself on the bare face of the boulder clay cliff—*Cnicus palustris*, *Primula veris*, *Anagallis tenella*, *Menyanthes trifoliata* with an intricate network of rhizomes almost filling up the partially dried up pond, and flowering profusely, *Myosotis palustris*. *Polygonum amphibium*, var. *terrestre*, *Listera ovata*, *Orchis mascula*, *Juncus glaucus*, *Sparganium simplex*, *Lemna trisulca*, *Alisma Plantago-aquatica*, *Potamogeton natans*, and the sedges, *Carex rostrata* and *C. vesicaria*. The grass, *Deschampsia cæspitosa* was in very numerous tussocks. Three ferns, viz., *Athyrium Filix-femina*, *Lastræa Filix-mas* and *L. dilatata*, were observed on the Flat Cliff; and in the ponds *Equisetum limosum*.

Referring to the almost cushion-like appearance mentioned above concerning *Ulex europæus* (furze) and *Prunus spinosa* (sloe), it may be observed that the reason for the remarkable habit seemed for the first time to be quite apparent to us. All the trees and shrubs that are in exposed situations on our coast have their apices and topmost branches partially dead and rotting; the cause whereof being due to the tenderest growth succumbing to the all too prevalent attacks of cold East winds combined probably with frequent douches of salt spray. Below the dead portion of each shoot, where an excess of nutrient material is bound to congregate, numbers of buds burst forth which ultimately become shoots and are afterwards treated in the same fashion as the now partially dead branches. What is done in the garden and shrubbery with say, privet, hawthorn, etc., to secure a dense growth instead of a tall and spindly one, is done at Filey in a natural way.

The geologists who took the northward route towards Gristhorpe and Cayton Bays were not unobservant of plants they passed, and in addition to those mentioned above the following may be noted, viz:—

Pedicularis sylvatica, *Euphrasia officinalis* and *Rhinanthus Crista-galli*, all three semi-parasitic plants, chiefly on roots of grasses, were growing quite close together in a field on the top of the cliff. *Orchis Morio* together with *Ophioglossum vulgatum* (Adder's tongue fern) were also seen in the same locality.

(*To be continued*).

FIELD NOTES.

ICHNEUMONS.

***Ophion stigmaticus*, etc., in Yorkshire.**—It is advisable to correct a mistake which Professor Carr was unwittingly led into in his record of Yorkshire ichneumons on page 94 of *The Naturalist* for March last. Knowing that *Agrotis agathina* had never been recorded from Wakefield, I asked Mr. W. Fletcher from whence he had obtained the larvæ which produced *Ophion stigmaticus* and *Echphoropsis viennensis*, to which he replied that they were from Skipwith Common near Selby. As Prof. Carr had received them from Wakefield (through Mr. J. W. Saunt), he naturally concluded they were from that district.—Geo. T. Porritt.

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MOLLUSCA.

***Pisidium henslowanum* in Lincs. S.**—Recently I visited Bardney, Lincs. I crossed the bridge and strolled down the south bank of the River Witham making a dip here and there for mollusca, which were apparently scarce. Among the few found were five specimens of *Pisidium henslowanum*. This is an important find as the only specimen recorded as *P. henslowanum* for S. Lincs. in my 'Non-Marine Mollusca in Lincolnshire' ('L.N.U. Transactions,' 1905) has since been identified, and recorded in his 'Cat. Brit. Species of Pisidium,' B.M. (N.H.) 1913, by Mr. B. B. Woodward as *Pisidium supinum* and therefore makes this the only record of *P. henslowanum* for South Lincolnshire, Div. 13E.—C. S. Carter, Louth, June 7th, 1914.

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NEUROPTERA AND TRICHOPTERA.

Lincolnshire Neuroptera and Trichoptera.—Some little time ago, Mr. F. W. Sowerby of Cleethorpes sent me for determination a few Lincolnshire Neuroptera and Trichoptera which may as well be placed on record. They were as follows: *Ischnura elegans*, *Agrion puella*, *Panorpa germanica* (Cuxwold), *Raphidia xanthostigma* (Roxton), *Hemerobius quadrifasciatus* (Cuxwold), *Chrysopa alba* (Bradley), *Grammotaulius atomarius* (Bradley), *Limnophilus flavicornis* (Croxby), *L. vittatus* (Croxby), *L. affinis* (Croxby and Grimsby), *L. auricula* (Roxton), *L. lunatus* (Croxby), *Mystacides longicornis* (Croxby), *Silo pallipes* (Freshery Bog), and *Halesus radiatus* (Cuxwold).

Hemerobius inconspicuus can be added to the Lincolnshire list, Mr. Kenneth J. Morton having recently detected a specimen among my series of *H. elegans* taken at Wells or Alford, so long ago as 1888, and sent to me by the late Mr. James Eardley Mason, along with *H. elegans* also from Lincolnshire.—Geo. T. Porritt, Huddersfield.

William West, F.L.S.

In Memoriam.

WILLIAM WEST, F.L.S., 1848—1914.

(PLATE XXII.).

THE story of the life-history of our late friend William West, the loss of whom by his death on the 14th May is one of the greatest which Yorkshire and botanical science have sustaind of late years, is the tale of the gradual development of an exceptionally keen intellect by its own inherent force and vitality, from an excellent observer and all-round naturalist to the highest position as a specialist in the study of freshwater algæ.

From the beginning he was an ardent nature-lover, a keen enthusiastic observer, and one with ever a wide and most comprehensive grasp of the subjects he took up. Beginning first of all with no special advantages beyond his own personality, he trained himself as an accurate field-botanist, familiar with the whole range of the flowering-plants, and then turned his attention to the cryptogams, with all groups of which he became familiar—Mosses, Hepatics, Lichens, Fungi, Algæ. Next, when fully-armed with the literature of the subject, he devoted his attention to the study of the freshwater algæ, and more particularly the Desmidiaceæ, on which he speedily became one of the greatest living authorities. Later still he turned special attention to the investigation of freshwater phytoplankton, achieving results of considerable scientific importance.

William West was a native of Leeds, a city which has produced not a few naturalists of high distinction. He was born on the 22nd of February, 1848, on the edge of Woodhouse Moor, his father being George West, of 8 Delph Terrace. They were attendants at St. Mark's Church, and William was in its choir, being of a musical turn, and later was an able performer both on the flute and piano.

He studied for the pharmaceutical profession, and was apprenticed to a chemist in lower Briggate, Leeds, opposite to the shop in which his namesake, William West, F.R.S. (who came to Leeds in 1816 and died 1851) founded the business which is now carried on by Reynolds & Branson at the same address. Even at this time he was a persevering and indefatigable student, attending evening classes for Latin and French. Taking an early interest in microscopical work, he used in after years to speak of going without his dinners at this time to save money to acquire the 'Micrographic Dictionary.'

In 1870 he passed his professional examination and was registered on the 16th November; and in 1872 he removed to Bradford and set up in business at 15 Horton Lane.

In 1874 he married Hannah Wainwright, also a native of

Woodhouse Moor, Leeds, who died in 1904 after several years' invalidism.

Their children were three in number—all inheriting natural ability of an exceptionally high order. Both sons went through brilliant careers at school and afterwards at Cambridge University, where both of them graduated with the highest honours attainable. The elder son, William junior, died in 1901 at Mozufferpur in India, within about a fortnight of taking up a biological appointment. The younger son, George, is the present Professor of Botany at the University of Birmingham, and the daughter, May (Mrs. J. W. Haigh Johnson), possesses scientific and artistic ability.

In 1886 William West took up science teaching as a profession, and later gave up business to devote himself to his appointment as Lecturer in Botany at the Bradford Technical College, afterwards adding biology and materia medica to his curriculum of work. Here his teaching was remarkably successful and thorough, and it is supposed that no other teacher can have sent up more students to the Royal College of Science in London than he did. Enthusiastic, lively, thorough, sound and accurate in his methods, he was a born teacher, and commanded the respect and enlisted the affection of his pupils to such an extent that, as more than one of them has put it, it was more like a father in the midst of his family than a teacher with a class, and many of the students continued to attend his classes long after their stated courses were over. The country rambles that formed part of the courses were occasions that brought out the ability of the teacher and elicited the best work of the class. Nearly all the members of the Bradford Naturalists' Society have attended these classes, and the exceptionally large number of original investigators and able naturalists who are included in its membership, is in itself evidence as to the effect of his teaching and his personality. Even well-known ecologists have written to say that they also have been influenced in their work by coming under the spell of William West, and that in his full knowledge of *all* kinds of plants they have been made to feel how comparatively little they knew.

His botanical career—apart from the early study and training—began about the year 1877, at the time of the establishment of the Yorkshire Naturalists' Union on its present basis. William West was one of the men who made the Union —one of the band of able and competent naturalists who helped its first secretaries to make the Union almost at one effort the the powerful instrument of local scientific research which it has ever since been, during a period of thirty-seven years.

Attaching himself to the Botanical Section, he succeeded Dr. H. Franklin Parsons in the secretaryship of the Section,

and the reports he drew up for 1879 and 1880 amply evidence his all-round botanical status. After the first few years the increasing claims of his professional work precluded his taking a very active part in the proceedings, but he was always interested, and was one of the chief botanical experts, and eventually the appreciation of the members was shown by his election to the Presidency of the Union. This was in 1899, at the close of which he delivered an able address, in which he gave a closely-reasoned ' Outline of the Evolution of Plants.'

In the earlier years (1878 to about 1887) he was an all-round botanist, with an unapproachably wide and accurate knowledge of all groups both of flowering and flowerless plants. Numerous notes and short papers, upon such subjects as Mosses (1878), the Autumn Flora of Whernside (1879), Lichens in Buckinghamshire (1880), a Stroll near Baildon in February (1881), a Few Days' at Field Botany in Scotland (1881-2), the Principal Plants of Malham (1883), the Plants of the Bradford District (1886), the Towton Rose (1891), and a considerable amount of material contributed to Lees' Flora of West Yorkshire (1888), appeared during these years, and in 1904 he co-operated with Mr. John Cryer in a paper on the New Polygala.

Good as was all this preliminary botanical work, excellent as was his educational work at the college, his principal work in life was now being taken up, and he was concentrating his energy and ability upon the study of the Freshwater Algæ, especially upon the Desmidiaceæ. His son George was now growing up, and co-operating in these studies.

And now it was that the practical self-training of the father, the parental and academic training of the son, based as they were upon the combinionat of field-work and minute and precise appreciation of specific and varietal differentiation on the one hand, and on the other of capacity for broad generalization, began to bear fruit in abundant measure. Theirs was no mere local study, the whole world became their province ; and the possession of the complete literature and of innumerable gatherings from everywhere that an algologist went, with the ready aid of leading European and American investigators, enabled the two Wests to establish their reputation among the foremost students of their subject, fully abreast of their greatest contemporaries, fully equal to their most distinguished predecessors.

Indeed the father's most extraordinary knowledge of cryptogams, which was both wide and deep, whether these were mosses, hepatics, lichens or algæ, and of their ecological conditions, made him a quite unique personality, certainly in Britain, probably in Europe. He was always in advance of his time, an ecologist long before the term itself was invented,

always fully conscious of the importance of the common and dominant forms, ever alive to the significance of every observation he made.

The algological investigations which were now his and his son's chief line of research, were most diligently and systematically prosecuted. Holidays were all utilized for the accumulation of material, many parts of the British Isles being visited, especially the montane regions of Scotland and Ireland, North Wales and the English Lake country.

The work began near home. Their native county of York was fully worked, lists being published for each of the three Ridings, and finally in 1900-1901 a complete Alga-Flora of the whole county.

Then came papers dealing with the English Lake District (1892), the South of England (1897), North Wales (1890), Scotland (1893), the Orkneys and Shetlands (1905), the West of Ireland (1892), the North of Ireland (1902), and the Clare Island Survey (1912).

European countries were left to continental workers, except that papers were published concerning Denmark (1891) and Portugal (1892).

Material was now being sent to them from all over the world, and papers were published for the American States of Maine (1888, 1891), and Massachusetts (1889), and for the West Indies (1894, 1899).

For the Old World were published memoirs dealing with Singapore (1897), Koh Chang (1901), Ceylon (1902), Burma and other parts of India (1907), and Kinabalu and North Borneo (1914); and meanwhile another able Leeds algologist, Mr. W. Barwell Turner, had monographed the Indian Desmids.

Madagascar was dealt with by the Wests in 1895, Central Africa in 1896, and Welwitsch's African collections in 1897; and in 1911 the freshwater algæ collected by the Shackleton Antarctic Expedition.

All these were in addition to numerous notes in various journals, and articles of more general scope and import, such as on the Conjugation of the Zygnemaceæ (1891), and Observations on the Conjugatæ (Annals of Botany, 1898).

Of late years much of the purely algological work fell to the younger West, while the elder devoted much time to Mosses and especially Lichens and also to ecological observations on bryophytes and Lichens.

Finally came the publication by the Ray Society of the culminating work—the 'Monograph of the British Desmidiaceæ'—of which four volumes have appeared (1904, 1905, 1908, 1911) and the remaining two still remain to be finished by the surviving author.

(*To be continued*).

MAMMALS.

White-beaked Dolphin at Redcar.—On Thursday, 11th June, a White-beaked Dolphin (*Delphinus albriostris*) was noticed near West Scar by three fishermen, who succeeded in driving it ashore, and secured it by means of a 'clove-hitch' passed round its tail. It measured 7 feet 7 inches in length, and has been purchased by the Middlesbrough Museum.—Thos. H. Nelson, Redcar.

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MOSSES.

***Hypnum fluitans*, group *Amphibium* var. *Robertsiae* Ren. & Dixon.**—I found this species on Shacklesborough Moss during the meeting of the Yorkshire Naturalists' Union to Middleton-in-Teesdale in May 1910. This variety was described as new in the 'Journal of Botany,' by Renauld and Dixon in August, 1901, and the only habitat was in Merioneth, where it was found in September 1898. Quite lately I examined my gathering, and being struck with the beautiful glossy appearance and the variegated colours, as well as the structure, I sent it to Mr. H. N. Dixon under the name var. *Robertsiae* and he confirmed my identification. The species is known only in the two habitats above mentioned.

Eurhynchium Swartzii.—When boating on the River Ouse on 15th August, 1908, I found this moss on an old stump in a spot often submerged by the river, and only to be approached by boat. Its very wide leaf cells were different from those of *E. Swartzii*. After re-examining the moss a short time ago, I sent a specimen to Mr. H. N. Dixon who replied, 'I am inclined to see in your moss an attempt on the part of a *Eurhynchium* to see how much like an *Amblystegium* it can make itself by a hygro-phytic environment.' In other words we have here one genus of mosses approaching the form of another genus.—William Ingham, York, 6th June, 1914.

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As a supplement to *La Feuille des Jeunes Naturalistes* for June, is an admirable series of plates illustrating 'Les Mollusques de la Baie de Saint-Malo.'

In *The Lancashire Naturalist* for May, Mr. J. W. Ellis records *Puccinia sonchi*—a plant parasite of the Sow Thistle, in Cheshire, for the first time in the British Isles.

In the *Entomologist's Monthly Magazine* for June, Mr. E. A. Newbery has the following:—'*Philhydrus halophilus* Bedel: Supplementary and Corrective Note.' He writes: 'Since bringing forward the above species in the April number, I have seen specimens from Deal. I find that the character given in my table to separate *P. halophilus* Bedel, from *P. bicolor* Fab., depending on the form of the transverse furrow on the head, is of no value, since it is not constant, the furrow being often as angular as in *bicolor*. Nor is the character of the alutation at the base of the head of the absolute value I ascribed to it, as it is present in *bicolor* behind the eyes when the head is protuded, but is much less extensive than in *halophilus*.'

NORTHERN NEWS.

We regret to notice the death of the Rev. E. N. Bloomfield, M.A., the well-known entomologist.

The Agricultural Economist and Horticultural Review for June contains an illustrated article on the charms of Harrogate.

Professor C. J. Patten, of Sheffield, gave a series of lectures on 'Bird Migration,' at the Royal Institution of Great Britain, London, during May.

In No. 2323 of *Nature*, Professor Schäfer makes a strong attack on the anti-vivisectionists in regard to their attempts to prohibit experiments on dogs.

The Board of Agriculture and Fisheries has issued *Leaflet No.* 284 dealing with the preservation of outdoor timber, which should be read by everyone interested.

The Forty-third Report of the Public Libraries, Art Galleries and Museums Committee of Rochdale is to hand and contains an account of the work done at these institutions during the year.

The Journal of the Board of Agriculture for May contains articles on 'Some Irish Larch Plantations,' 'Pollination and Fertilisation of Hops,' 'the Wart Disease of Potatoes,' and 'Narcissus Flies.'

Part 89 of *The Yorkshire Archæological Journal* is largely occupied by an account of the History of the Yorkshire Archæological Society, with photographs and notices of the more prominent members, by Mr. S. J. Chadwick.

Part 4 of Volume 6 of the *Annals of Archæology and Anthropology*, issued by the Liverpool Institute of Archæology, contains a well-illustrated report on the Roman Cemetery in the Infirmary Field, Chester, by Prof. R. Newstead.

Mr. George Abbott has favoured us with a copy of his paper on 'Discoid Limestones which Simulate Organic Characters—A case of Inorganic Evolution' which is reprinted from *The Pioneer* for March. It is illustrated by a number of excellent photographs.

Professor Sollas has recently visited the 'painted caves' in North Spain and saw some impressions of human hands on the walls. He assumes that these are of palæolithic man, compares the imprints with those of Englishmen, and opines that the hands of palæolithic man were unusually large, and concludes by these alleged imprints that 'the existence of two distinct races in the Aurignacian age, already indicated by the Mentone skeletons and the carved statuettes, receives additional confimation.' We hope for the sake of Professor Sollas' reputation that no one will come forward to point out that these are modern impressions.

At the recent annual meeting of the Leeds Philosophical and Literary Society numerous gifts to the museum were recorded. Among them was a valuable and perfect bronze halbert with its three rivets intact, of the period of 1300-1000 B.C., found in a layer of sand, in which were pieces of black oak lying right above it, given by Mr. W. H. Bartholomew. Mr. Bartholomew had supplemented this donation by a further gift of eleven brenze objects, which were dredged up some years ago from a gravel bed in the River Calder, a short distance below Smalley Bight, near Stanley Ferry. The series consisted of a flanged celt, a palstave, seven looped socketed celts, a socketed celt without a loop, and a bronze object with a bearded man's head on it. These objects had the added interest of being local finds, and also in being in a very fine state of preservation, the patina on the celts being little injured. This acquisition was one of the most valuable donations received by the society in late years.

NOTES AND COMMENTS.

LEGAL NATURAL HISTORY.

We take the following fair sample of legal natural history from the daily press:—Mr. E. H. Tindal Atkinson said the Corporation of Malton enjoyed the right of fishing at Goldhangers Spit, in the River Blackwater, under a charter older than the Magna Charta. Five men took winkles at this place on December 2nd last, and they were fined for 'taking fish,' and thus infringing the rights of the Corporation. It was argued for the men that, as a winkle could not be taken by angling, it was not a fish.

Mr. Justice Darling: The whale which swallowed Jonah, we are told in the Bible, was a fish, but it is now generally admitted that he is not a fish, though you can take him by angling. (Laughter).

Mr. Atkinson said that if a winkle was a fish, so was an oyster, but the Legislature had said it was not.

LEGAL HUMOUR.

The Lord Chief Justice: We hear of oyster fisheries.

Mr. C. E. Jones, for the Corporation, said the winkle, being a shell-fish, came within the dictionary or general category of 'fish.'

In reply to Mr. Justice Darling, Mr. Atkinson said the winkles in question were taken for eating.

The Lord Chief Justice said he believed they were eaten with a pin. (Laughter).

Mr. Justice Darling: That reminds me of what Mr. Sam Weller said on one occasion: 'Don't compel me to use stronger measures,' as the nobleman said to the winkle when he cracked him behind the dining-room door, after vainly trying to extract him with a pin.' (Laughter).

After further argument Mr. Justice Darling pointed out that the words of the section applied to fish taken 'in the water.' The point had not been taken by the appellant's counsel, but it seemed that the men were picking up the winkles on the rocks, and that would not be 'in the water.' The case was sent back to the justices for evidence to be taken on the point whether the winkles were taken 'in the water' or not.

MUSEUMS CONFERENCE.

The 25th Annual Conference of Museum Curators was held at Swansea during the week commencing July 6th, this being the first visit of the Museums Association to Wales. In this Principality museum matters have recently received a great impetus by the establishment at Cardiff of the National Museum of Wales; and other towns are doing their best to emulate the example set by their more fortunate neighbour. By the

invitation of Dr. Hoyle the members were able to visit Cardiff on their way home and examine the new buildings so far as they are erected. At Swansea, the delegates were welcomed by his Worship the Mayor and the more prominent of the Corporation members and officials. A visit was also paid to the large museum and educational buildings at Merthyr, by the invitation of the Merthyr Corporation. At this place a large castle and adjoining buildings on the outskirts of the town have been purchased for the purpose.

SWANSEA PORCELAIN.

At Swansea, the magnificent new Glynn Vivian Galleries were inspected, among the exhibits being what was described as the finest collection of Swansea and Nant Garw porcelain ever gathered together. This had been specially selected for the Conference and was of peculiar value to the curators having porcelain in their charge. A paper giving details of the art and craftsmanship of the potteries was read by Mr. Herbert Eccles of Neath, one of the greatest living experts on the subject. There was also a special exhibition of a useful series of old oak furniture, lacquer-work, and other *objets d'art*. The Royal Institution of South Wales at Swansea opened its doors to the members, and displayed its fine museum of geological, zoological and historical collections, as well as a valuable library. It was possible here to learn many lessons in museum matters, not only in what should be done, but what should be avoided.

PAPERS READ.

The members had a fairly strenuous week. The President, Mr. Charles Madeley of Warrington, took for his address, 'The Theory of the Municipal Museum.' Mr. W. Grant Murray gave a description of the new galleries at Swansea in which the industrial and applied arts are happily illustrated. Mr. C. C. Grundy gave an address on 'Art in Wales,' a subject also selected for the popular evening lecture by Mr. E. Rimbault Dibdin, of Liverpool. New methods of protecting and restoring works of art were dealt with by Messrs. R. Quick and I. J. Williams, and the difficult question of the arrangement of ethnographical collections was dealt with by Dr. Harrison of the Horniman Museum, who gave many useful hints on the subject. Mr. Reginald Smith described the new arrangements at the King Edward VII. Galleries at the British Museum, and Mr. Arthur Deane exhibited and described the designs for the magnificent new museum buildings being erected in Belfast. Bearing more directly on work in provincial museums were papers on 'The Museum and the Schools,' by Mr. E. Howarth, 'The Children's Room,' by Mr. B. H. Mullen, 'Museum Publications,' by Mr. H. Ling Roth, a suggestive paper on a new

method of preparing skeletons by Dr. Langton. Mr. F. Leney of Norwich dealt with the question of insurance of museum specimens and gave results of the correspondence he had had with the various museums in the country on the subject.

VISITS TO COLLECTIONS.

As is usual on these occasions, the members had access to the houses of the more wealthy inhabitants in the neighbourhood, where the art treasures were freely shown and were described by experts from the Victoria and Albert Museum, etc. In this way we visited Cyfarthfa Castle, Margam Abbey, and St. Donat's Castle. A visit was also paid to the cave known as Bacon Hole at Gower, where many archæological objects were examined. Mr. Rimbault Dibdin, of the Liverpoool Art Galleries, was elected President of the Association for the forthcoming year, and the changes in the officers were, Editor, Mr. W. R. Butterfield, and Executive Committee, Messrs. F. R. Rowley (Exeter) and T. Sheppard (Hull).

PRIMITIVE PAINTINGS.

It will be remembered that a little while ago a well-known geologist gave to the world his discovery of certain ochreous stains on the walls of a cave known as Bacon Hole, in the Gower peninsula, and these he opined were the handiwork of palæolithic man. They were described as the oldest 'wall paintings' in these islands. At the recent meeting of the Museums Association at Swansea the members paid a visit to this cave, under the guidance of a prominent local antiquary. The stains were examined, and the leader pointed out that there were now certainly more than when described by the Professor of Geology. This being so it would seem either that palæolithic man is still hanging round the Gower area and daubing the cave walls to mystify us, or the Professor is not quite correct in his conclusions.

CHARACTERISTIC FOSSILS.

The British Association for the advancement of science has issued a Report of the Committee to consider the preparation of a list of Characteristic Fossils. In connection with this the following basis of operation was adopted. (1) "Definition—A characteristic fossil is one, either genus or species, that is restricted to a particular horizon, or is abundant at the horizon and comparatively rare elsewhere, so that its presence in a bed would raise a clear presumption of the stratigraphical position or age of the bed.' (2) A majority of the members of the committee were in favour of having three lists drawn up—(*a*) Elementary, 200 species; (*b*) Advanced, 400 species; (*c*) Honours, 600 species. As to the advantage of division (*c*) there was some difference of opinion,

several members considering that Honours students should be left unfettered to compile their own lists. The report is signed by Messrs P. F. Kendall and W. Lower Carter, and is valuable from the fact that a list of typical fossils of each important geological horizon is given.

THE DERBYSHIRE COALFIELD.

Under the somewhat comprehensive title of 'The Geology of the Northern Part of the Derbyshire Coalfield and Bordering Tracts,' 'Memoirs of the Geological Survey, England and Wales. Explanation of sheet 112 and the Southern part of Sheet 100,' by W. Gibson, C. B. Wedd, G. W. Lamplugh, R. L. Sherlock and L. Moysey, has been issued a Memoir at the reasonable price of 3s. It contains nearly 200 pp., several plates and sections, and a fine series of plans, well printed on plate paper showing the more important physical features of the area. Mr. Lamplugh has edited the part which we are pleased to see is rather better printed than usual, and the paper forming the cover is quite substantial. We should like to congratulate the Survey on the improvement now being made in the general appearance of these Memoirs.

RESTS FOR BIRDS.

We notice from *Bird Notes and News*, Volume VI., No.11, that steps are being taken by the Trinity House to arrange resting places round the lanterns of lighthouses in order that the birds fascinated by the light may have shelter. Mr. Thijsse, a Dutch naturalist, has shown that only a comparatively small proportion of birds are killed at the lighthouses by dashing themselves against the glass, whereas a very large proportion drop down from sheer exhaustion after flying round and round the light. After placing perches on the Terschelling light, Mr. Thijsse was able to report that the loss of bird life had been reduced from thousands in a night to something like a hundred in the whole of the migration season. The Royal Society for the Protection of Birds is going to arrange for similar perches on the top of the Spurn lighthouse. It is recommended to other lighthouses, and it is hoped that more will be treated in the same way in the future.

THE WATER SUPPLY OF NOTTINGHAMSHIRE.

Geological Survey Memoir, 1914, pp. iv.+174. 5s. London: Fisher Unwin. This Memoir forms one of a series on the Water Supply of English Counties which is in the course of publication by the Geological Survey. It contains (1) a general account of the geological structure of Nottinghamshire in relation to water-supply; (2) a chapter on the rainfall by Dr. H. R. Mill; (3) a description of the conditions of water-supply in every town and village; (4) particulars of sections,

Naturalist,

showing the strata passed through in wells, mine shafts, borings, etc.; and (5) a short discussion of the quality of the underground waters with numerous analyses, illustrating the character of the water from the various formations. Nearly the whole of the water-supply of the county is derived locally from underground sources, so that the geological conditions are of particular consequence in this area. There is a coloured geological map on the scale of four miles to one inch. The Memoir has been written by Messrs. G. W. Lamplugh and B. Smith.

NEWSPAPER NATURAL HISTORY.

As a sample of the nonsense that is meted out in the popular press, we notice an elaborately illustrated article on 'Relics of the Past unearthed by the Sea' in the *Daily News and Leader* recently. Among them we notice mammoths, saurians, a bear, and pterodactyls all besporting themselves together on the shore. At Whitby we learn that ammonites are not found in sufficient quantity to meet the supply, and imported fossils are offered to the visitors. At the same place jet, 'or fossilised coal' [!] can be found, and 'if you are lucky you can find the belemnite, yellowish and pointed. It is the skeleton of an extinct animal.' The amusing piece of information is volunteered that belemnites are also found at Bacton in Norfolk. We next learn that where there is crag in the cliffs the visitors should not only find fossils *but* sharks' teeth. 'On the whole it is more exciting looking for sharks teeth than for fossils, though some of the fossil ferns are very beautiful.' It is stated that at Bridlington there are shelly beds well worth exploring, though it does not explain that the enthusiast would have to blast several hundred tons of promenade and sea wall before reaching them. At 'Hackven' near Scarborough corals are obtained, and near St. David's in Wales, Trilobites and Craptolites (sic.) can be found. So long as daily papers will print schoolboys' essays we presume schoolboys will go on writing them.

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Among the contents of the *New Phytologist* (double number, Vol. xiii, Nos. 4 and 5, April and May, 1914, published May 25th) we notice 'Sketches of Vegetation at Home and Abroad'; 'Further Observations on *Hirneola auricula-judae* Berk.'; 'The White Moss Loch: A Study in Biotic Succession'; 'Xerophytic Adaptations of Bryophytes in relation to Habitat.'

The Geological Magazine for June contains an article on 'Some Inclusions in the Great Whin Sill of Northumberland,' by Dr. J. A. Smythe; a continuation of Dr. R. L. Sherlock's paper on 'The Foraminifera of the Speeton Clay,' with plates; 'Some new Rock-building Organisms from the Lower Carboniferous, Westmorland,' by Prof. E. J. Garwood, and an article on 'Gypsum and Anhydrite in Genetic Relationship,' by Professor R. C. Wallace.

NESTING HABITS OF THE COMMON MOLE.

WM. FALCONER,
Slaithwaite, Huddersfield.

When at Wicken (Cambs.) during Whit-week, I became acquainted with some very interesting variations in the nesting habits of the mole, which are evidently adaptations to the varying water conditions in the soil. In the dryest of seasons in the fen, water is never far from the surface, and, if the moles, which live there, made their nests in the usual manner by burrowing, percolating water would very soon find its way in and the helpless broods perish. However they have come by the knowledge, they have learnt not to do so, but merely construct a sort of spherical nest of lengths and bits of old dry leaves, and deposit it amongst bedding of the same materials in a hollow of the ground between tufts of sedge and grass, and concealed by them. Incidentally while collecting in the fen, I found two such nests so situated, each somewhat larger than a cricket ball, and containing five naked young ones. Although the materials were not fastened together in any way, being only loosely interwoven, the structure was compact enough to be taken up into the hand and examined without falling to pieces or disturbing the young.

I have not visited the fen during a wet season when the higher level of the water renders even such a method as the one described above impossible, but on making inquiries I was informed that the moles then build very high and comparatively massive mounds (containing 'as much soil as would fill a wheelbarrow'), and are thus able to rear their families, without the risk of a watery grave.

The mole is hardly wise enough to foretell the kind of season, but probably chooses its method in accordance with the conditions which obtain at the time it begins the process of nidification, and may occasionally, after having prepared for a dry season, be overwhelmed by a sudden alteration in the weather.

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We regret to learn of the death of Mr. John Stears, of Hessle, near Hull, at the age of 76, who a quarter of a century ago was secretary to the old Hull Field Naturalists' Society, and took a great interest in geology, and for many years was local treasurer to the Yorkshire Naturalists' Union. He is perhaps best known as a 'water diviner,' and the present writer believes that he seriously and conscientiously considered that he had the power of finding water by means of a bent hazel stick or a bent wire. He also claimed to be able to detect metals in a similar way. He was consulted by various authorities in all parts of Britain, and even went so far afield as Jamaica and the shores of the Adriatic for the purpose of finding water. He was sometimes successful and sometimes not.

THE STORM AT TEESMOUTH ON JULY 2, 1914.

T. H. NELSON, M.B.O.U.,
Redcar.

NEVER within living memory has this district been visited by so remarkable a storm, nor one so disastrous to bird-life, as that which arose with startling suddenness and swept over the Teesmouth shortly after noon on 2nd July. A vivid and alarming display of lightning heralded a cyclone of terrific violence, accompanied by a heavy fall of hail, with large lumps of clear ice, and it was afterwards found that great havoc had been wrought

Dead Gulls at Sandsend.

amongst the seabirds in the Tees estuary, several hundreds being killed and washed up to high-tide mark.

On visiting the scene next day, my wife and I saw the bodies of gulls scattered along the high-water line, and counted more than three hundred within a distance of a quarter of a mile near Redcar jetty, without taking into consideration those by the breakwater side. In some places they were in groups of from six to twenty, or more, and others had been driven against the jetty where they were partly buried in the sand. I was informed that a bogey load had been taken away by workmen, and many wounded birds had sought refuge amongst blocks

of slag, or had wandered to the river channel, where they were either caught by boys or carried off on the tide. Two or three old curlews and a duck were picked up on the sands, and an adult gannet was captured among the bents on the breakwater. I feel sure that, if other three hundred be added to the numbers mentioned, this would form a very low estimate of the total casualties.

With the exception of a few lesser black-backed gulls, the specimens examined by my friends and myself were of the common species (*Larus canus*), and the black-headed (*L. ridibundus*), in the proportion of about three of the former to one of the latter. Most of the common gulls had a few immature feathers on the back and wings; nearly all *L. ridibundus* were in adult plumage. Almost all those I saw had broken wings or wounds on the head, and there can be no doubt that these injuries were caused by the large pieces of ice driven by a furious gale. I noticed several black-headed gulls in a dazed condition, and very weak on their legs, and the feet and legs of some dead ones were contracted and drawn up close to the body. A score, or more, of gulls were skinned, and in every case there was evidence of serious injury from blows on the back, head, or wings. An adult curlew had its skull fractured in two places, a broken wing, the neck damaged, and the tail completely shorn off.

An old wildfowl-shooter, whom I have known for many years, and on whose word I can rely, witnessed the whole occurrence. He tells me that when the storm was approaching, he saw a large assemblage of gulls, regular frequenters of the Tees 'slems,' showing signs of uneasiness, screaming loudly in alarm, then rise in a body and make for the marsh; but, before they got halfway across the sands, the cyclone struck them and they were lost to view. When the storm had passed, the sands were strewn with dead gulls, dozens of wounded were helplessly straggling about, and, as my informant walked amongst them, they showed no fear, evidently suffering from shock and buffeting by the wind and ice.

If I had not, myself, had ocular proof of the peculiar and tremendous force of the storm, I would hesitate to mention an almost incredible statement made by a resident at the breakwater, who declares he found some wounded gulls actually held by one or both of their wings being embedded and driven into the sands by the ice, so rendering them powerless to escape. He released the unfortunates in this predicament. Three badly stunned black-headed gulls were placed in the garden here on the 3rd July—next morning two had flown, and, later in the afternoon, the third one, whilst I was showing it to two visitors, got on the wing and flew off.

Eye-witnesses of the cyclone give eloquent testimony of

the weird electric display, the force of the wind, and the effects of the fall of ice. From the Fifth Buoy Light, and right up and round the river, electricity was playing. Two sailing vessels were lighted up, everything on deck was thrown out in strong relief against the darkness of the coming storm. Then came a blinding flash as though a fireball had burst, followed by jagged, or forked, lightning, dancing in parallel vertical lines and breaking out sideways in a terrifying fashion. Suddenly the roar of falling hail and ice was heard, and the scene riverwards blotted out. A seven ton water-tank was blown for 800 feet along the metals and round a sharp curve; a half-ton bogey was lifted clear of the line and blown through the hand railings into the river; about 500 feet of rails were broken, and wherever the ice had struck the woodwork it was chipped as if rifle bullets had been fired. A salmon fisherman who was on the south side of the estuary had his 'sou'-wester' blown away, and it was seen, on his reaching shelter, that his head and face were bleeding from wounds caused by the large pieces of ice.* In contrast to this experience, another fisherman, at Sneaton Snook, on the north side of the river, afterwards said there was not sufficient wind to taughten his mooring rope.

We are indebted to Dr. A. S. Robinson for the accompanying illustration.

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The Chester Society of Literature and Art has issued its **Forty-third Annual Report,** which contains a summary of the work done in the different sections, as well as at the Grosvenor Museum.

From the Board of Agriculture and Fisheries we have received their valuable **Annual Report of Sea Fisheries** for the year 1913, part I., which is sold at 1/-, and part II. which is a similar price, contains the tables and charts. The compilation is a remarkable one, and contains much of value to the naturalist.

The Annual Report of the Marine Biological Association of the West of Scotland for 1913 is a much more substantial volume than usual. Besides containing much information with regard to the society's work, and illustrations of various forms of marine life, it includes a lecture by Professor MacBride on 'Some Problems of Marine Biology.' The report contains 125 pages.

The Journal of the Manchester Geological Society, Vol. XXIX., Parts III. and IV., is an unusually large and well illustrated part. There is a lengthy account of 'The Geography of East Yorkshire,' illustrated by chart and plan, with several blocks, by Mr. T. Sheppard, F.G.S.; a paper on 'Highways and Byways in the Balkans,' by Mr, G. Waterhouse; 'Spitsbergen: Past and Present,' by Mr. W. S. Bruce; 'The British Antarctic Expedition, 1910-13,' by Commander Evans, and 'The Formation of the Soil of Hungary,' by Professor B. de Inkey.

* Some plumbers were working in the "Look-out" near the fort, when a piece of ice crashed through a sheet of 26 oz. glass, 4 ft. 6 in. × 3 ft., shattering it and falling on the floor; one of the men took it up and the master plumber told me it measured upwards of 3 ins. in length, by nearly an inch ($\frac{7}{8}$) in diameter. They saw other pieces falling outside.

PUPA (VERTIGO) ARCTICA, WALLENBERG, AND ITS OCCURRENCE IN ICELAND, ETC.

HANS SCHLESCH.

'*Testa subperforata, cylindraceo-ovata, tenuis, subtilissime striatula, epidermide brunnea sæpe alba, nitidula, pellucida; spira convexo-conica; anfractus 5 vel 5½ convexi, sutura profunda, antice ascendens; columella plica obtusa, paries aperturalis plica compressa fere mediana, apertura triangularis, peristoma reflexiusculum, labro externo modice arcuato, denticulo obsoletissimo ante mediano.*'—(Mörch).

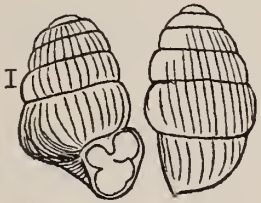
This genuine northern species was named in 1858 by Wallenberg*, but was in 1842 already described by Möller as *Pupa hoppei* † from Greenland. Later, it was found identical with the *Pupa arctica* of Wallenberg and finally *Pupa steenbuchii* Beck, ‡ *P. tirolensis* Gredler § and *Pupa tatrica* Hazay ‖ were placed under this species.

Already Eggert Olafsson ¶ had mentioned a *Cylindrus testa tota spirali ad extremitates obtusa, spiris 6, ore angustissimo*, a curious shell, of the size of a cabbage seed. The two whorls near the aperture are flesh-coloured, the others blue-grey. The specimens are found in the field among grass and moss, on and near the rocks near Saudlauksdalur in Bardastrandarsyssel, West Iceland. It seems certain that Eggert Olafsson's species is the same as *Pupa arctica*. Prof. J. Steenstrup found on his visit to Iceland in 1839-40 a fragment of this very interesting species, but Mörch** mentions no locality. In 1912 it was found again by Mr. F. H. Sikes†† on the rocks near Isafjördur and during a visit to the interior parts of a fiord of the same name in July 1913, ‡‡ the present writer found *Pupa arctica* in Heidalur in Mjóifijördur and Kaldalon and Armula in the vicinity of the mighty Drangajökul.

The species is in all probability distributed over all Iceland, likewise in Greenland to 70° n. lat. §§ In Norway it is found, according to B. Esmark,* in Gaustafjeld (Telemarken), Vardö, the Nordcap, Porsangerfjords, several places in the South Varanger 660 m. high on Svendborgtind in Maalselvedalen. In Sweden, according to Westerlund and Odhner, from the

* Moll. Lappl. Lulea, 1858, p. 18, f. 3-4.
† Index Moll. Groenlandiae, 1842, p. 4.
‡ Amtl. Bericht. 24 Versamml. Deutscher Naturf. u. Aerzte. 84 f., p. 122.
§ Nachtrage zu Tirols Land u. Süsswasser Conchylien, 1869.
‖ Die Molluskenfauna der Nördlichen Karpaten, etc., 1883, p. 356.
¶ 'Rejse igennem Island,' published by the 'Academy of Scientific' in Denmark, 1772, p. 1019.
** 'Faunula Moll. Islandiae,' Copenhagen, 1868, p. 199.
†† 'Journal of Conchology,' 1913, p. 56. ‡‡ 'Naturalist,' 1913, p. 420.
§§ Posselt: 'Grönlands Brachiopoder og Blöddyr,' Copenhagen, 1898, p. 264. Quoted from Nisik (Goodthaab), Ameralik, Kangerdluarsuk and Mudderbugten in Disko-Island (all in the Zool. Mus. in Copenhagen).
* 'Land and Freshwater Mollusca of Norway' (Jour. of Con., 1886, p. 111).

north (Quickjock, Pitea, Herjadalen, etc.) to Örebro, Stockholm, Nyköbing (Södermanland), spread in the North Westergötland, and at Jönköbing. In Finland it is spread over most of the country, and the species has certainly a large distribution in Northern Russia and Siberia (var. *extima* West from Baklanowsky). Moreover this species is found in Tegel, at Berlin, Kleinen Schneegrube in Riesengebirge (by Professor Reinhardt), Rotlerberg opposite Peitler Kofel in Tyrol, and in Tatra. In the fossil form it is found by Odhner†, in Billingen in Westergötland (Sweden). What Geyer writes‡ on the occurrence of *Pupa arctica* and other arctic species is of great interest; he says: 'During the diluvial period the large extension of glaciers took place and with it a period which still is manifesting itself in the molluscan world. The tropical climate of the tertiary period gave way to a colder one and at the end of it, the Alps had no glacier



***Pupa* (*Vertigo*) *arctica*.**

1000 m. higher up than now-a-days. When the temperature sank 4° Celsius under the present temperature, the glaciers spread down the valleys and over the lower country, and from the north they stretched as far as the German Mittelgebirge. The breadth of that zone, which was free from ice was about 300 km., having the character of tundras with their abundance of brooks, moors and streams of water divided by large and small forests. Formerly the more northern regions and the high mountains had their own fauna characteristic of a cold climate, but when forced by the advancing glacier it was compelled to move southward, and from the Alps into the ice-free 'sack,' and here came a mixed fauna, where arctic, alpine and aboriginal elements mingled together. Its character was mainly arctic-alpine. The incontestible retrograde movement of the glaciers at the end of the ice-period to the arctic zones and to the tops of the Alps, and the co-existent warmer climate in the lower country, had the effect that the

† Die Entwickelung der Molluskenfauna in dem Kalktuffe bei Skultorp in Westergötland, in Geol. Förh., Stockholm, 1910.

‡ Die Weichtiere Deutschlands, Stuttgart, pp. 104-106.

then arctic-alpine fauna withdrew in the same direction, so that the arctic regions and the high mountains received the previously mentioned fauna. In the arctic regions, and on the higher Alps, therefore, the descendants of the Tundra fauna should be searched for. While ascending the mountain slopes there remained in many lower places, colonies in moors, heaths, and on cold temperate hills, in moist and cold ravines, the rest of the glacial fauna. These samples, isolated and in small parties, spread over a large territory as islands in the great ocean of the widespread Middle-European Molluscan World.'

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FOSSILS.

***Cestracion* sp. from the Yorkshire Chalk.**—I recently obtained a tooth of *Cestracion* sp. in the Red Chalk at the foot of the cliffs at Speeton. This species does not appear to have been previously recorded for the Yorkshire Chalk, though it occurs in the Gault and Vectian for the South of England. It has been placed in the museum at Hull.—G. SHEPPARD, Withernsea.

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FISHES.

Electric Ray at Filey.—A report appeared recently in the local press stating that an Electric Ray had been taken in Filey Bay, and that the fish was shaped like a bass fiddle, and measured a yard and a half in length. The information reached me too late to enable me to see the fish, which had not been preserved, but by the aid of several Filey friends, I have been able to get a detailed description of it and the circumstances of its capture. It was caught on June 29th in a salmon net by a man named W. Richardson, who received several shocks while handling it. Not liking the uncanny beast and having no curiosity regarding it, he left it on the beach, where it was presently found by a man named H. Jayes, who brought it into Filey and exhibited it in the streets. It was not actually measured, but is estimated by several people who saw it to be two and a half feet in length, and was described as black on the top, and white beneath, with the skin smooth like rubber. Behind the eyes were two small circular 'blow-holes' with perfectly smooth edges, not serrated in any way. The details of this description, and especially the smooth edges of the temporal spiracles leave no doubt that the fish is the *Torpedo nobiliana* of Yarrell, a species which seems to appear on rare occasions on the southern coasts of England and Ireland, but of whose occurrence in Yorkshire waters I can find no previous record.—W. J. CLARKE, 51 Oak Road, Scarborough.

CLEVELAND SPIDERS.

J. W. H. HARRISON, B.Sc.,
Middlesbrough.

DURING the past winter I have had exceptional opportunities of investigating the Arachnid Fauna of some of the more remote Cleveland dales and have been able to extend the known range of several of the rarer and more critical species.

The localities visited were Farndale, Westerdale Moor, Basedale, Bilsdale Head, Greenhow Botton, Easby Moor, Great Ayton Moor and Eston Moor. In addition I have made a journey to the coast and have included the spiders noted then, together with one or two captures made near to the town.

Spiders which were practically ubiquitous have been placed in a general list at the end of the paper.

Theridion tepidariorum C.L.K.—Common in older greenhouses near and in Middlesbrough.

Pholcomma gibbum West.—I found a very curious example of this species, which at first I thought would prove to be a new species. It occurred on Great Ayton Moor.

Onesinda minutissima Cb.—Very abundant in Farndale, on Kildale, Eston, Great Ayton and Easby Moors. I cannot accept the suggestion (*The Naturalist*, 1913, page 135) that this is rarer in the Cleveland area than in the south-west of the county. It could not be more abundant than it is in all the above localities. The spider is a typically northern and sub-Alpine form, as both its British and Continental localities indicate. Most certain it is not of Western origin.

Further, its stations in our islands coincide with those of such typical northern lepidoptera as *Oporabia autumnata*, *Larentia caesiata*, etc.

Tapinopa longidens Wid.—Eston and Great Ayton Moors.

Floronia frenata Wid.—1 ♀ Saltburn. New to my local list.

Linyphia pusilla Sund.—Farndale, Eston Moor.

Linyphia hortensis Sund.—Farndale, Greenhow Botton, Turkey Nab, Great Ayton Moor.

Leptyphantes minutus Bl.—Marton.

Leptyphantes leprosus Ohl.—Bilsdale Head. Fairly common.

Hillhousia misera Cb.—Quite common. Farndale, Great Ayton and Eston Moors.

Bathyphantes gracilis Bl.—Eston and Great Ayton Moors. Rather common.

Bathyphantes parvulus West.—Great Hograh, Westerdale, Eston, 4 ♂♂.

B. approximatus Cb.—Eston. Not uncommon.

Porrhomma montanum Jacks.—Farndale. Common.

Hilaira uncata Cb.—Turkey Nab, Eston and Great Ayton Moors. Common.

Hilaira excisa Cb.—Great Ayton, Eston, Westerdale Moors, Basedale, Turkey Nab. Both of these spiders have a Northern range, or rather one affected by Northern forms.

Macrargus rufus Wid.—Eston, Farndale. Rather common.

Macrargus warburtonii Cb.—1 ♀ Saltburn.

Macrargus scopiger Grübe.—Fairly plentiful everywhere.

Centromerus expertus Cb.—Eston, Great Ayton Moor, Farndale. Common.

Centromerus arcanus Cb.—Great Ayton and Easby Moors, Farndale. Abundant. The same remark applies to this as to *O. minutissima* ; it is certainly not less common here than in the west of the county.

Microneta viaria Bl.—Eston.

Microneta saxatilis Bl.—Turkey Nab, Farndale.

Sintula cornigera Bl.—Farndale 2 ♀♀. First local record of this rare spider.

Rhabdoria diluta Cb.—Eston and Great Ayton Moors. Not uncommon.

Maso sundevallii West.—Eston.

Gongylidiellum vivum Cb.—Eston 1♀.

Tiso vagans Bl.—Redcar. Not uncommon.

Erigone atra var. *lantosquensis* Sim.—Greenhow Botton, Eston Moor. Not uncommon.

Erigone arctica var. *maritima* White.—Redcar. Abundant. I have now traced this spider right down the coast from Grangetown to Saltburn.

Dicymbium nigrum Bl.—Bilsdale Head, Farndale, Greenhow Botton, Turkey Nab, Redcar.

Dicymbium tibiale Bl.—Eston, Farndale, Turkey Nab.

Diplocephalus permixtus Cb..—Farndale. Both sexes, but not common.

Diplocephalus beckii Cb.—Great Ayton Moor, Eston, Farndale. Not uncommon.

Savignia frontata Bl.—Eston and Great Ayton Moors. Common.

Hypselistes jacksonii Cb.—Eston in the old locality. Very common and just becoming adult in October. This is so abundant in one restricted spot that I have to reject them as a sort of nuisance, somewhat like *Robertus lividus*, when in season. After October they thin out rapidly.

I take this spider to be endemic to Britain and to be a break of British origin from the Nearctic *Hypselistes florens* Cb. which occurs precisely in the same lot of rushes although I discovered it originally a mile away.

Minyriolus pusillus Wid.—Farndale, Westerdale, Turkey Nab, Bilsdale Head, Great Ayton Moor. Common.

Pocadicnemis pumila Bl.—Farndale, Normanby Intake, Eston Moor.

Lophocarenum nemorale Bl.—Great Hograh, 1 ♂.

Lophocarenum mengii Sim.—Turkey Nab, Great Ayton Moor. Not uncommon. See remarks on *O. minutissima* and *C. arcanus* above.

Notioscopus sarcinatus Cb.—This spider still remains a speciality of this district and is one of our most abundant Arachnids. It has occurred in every suitable locality I have visited, viz., very shallow slacks on Eston, Westerdale, Great Ayton, Easby, Kildale and Basedale Moors and also in Farndale wherever such slacks contain long, reasonably dry *Sphagnum*, protected by tufts of rushes.

It becomes adult about the second week of October and continues, but in diminishing numbers, until June in the following year. The creature has occurred only in two other localities in the world, viz., the department of Aisne, France, and Nürnburg, Germany, and in these localities in very sparse numbers when compared with the myriads which must occur in Cleveland.

Erigonella ignobilis Cb.—Quite common with *H. jacksonii* on Eston Moor; less common in Normanby Intake, on Easby Moor and in Lonsdale generally.

Erigonella hiemalis Bl.—Pretty common. Westerdale, Farndale, Greenhow Botton.

Troxochrus exilis Bl. (= *Tapinocyba pallens*, Cb.)—Bilsdale Head, Eston Moor. Common.

Cnephalocotes elegans Cb.—1 ♂ Eston Moor. First local record away from the coast.

Caledonia evansii Cb.—Westerdale Moor, Eston Moor. Common in the latter locality.

Evansia mærens Cb.—Occurs everywhere with ants usually *Lasius niger* or *Formica fusca*, although I once got it at Birtley, Durham, with *Myrmeca rubra*. Those on the coast at Redcar are quite melanic.

Cornicularia vigilax Bl.—Basedale, Westerdale Moor, Eston Moor, Normanby Intake. This is not rare locally and certainly not rarer here than elsewhere.

Cornicularia kochii Cb.—1 ♂ Redcar. This is a marsh and mudflat loving species. It occurs inside the breakwater, but this record outside removes it from the list of "suspects" as also does its occurrence in the Pennine Chain in Northumberland, and along the whole length of the Yorkshire shore of the Humber from Spurn to Brough, as well as on the Lincolnshire side of the estuary.

Ceratinella brevipes West.—Farndale, Easby, Eston, Great Ayton Moors. Common.

Ceratinella scabrosa Cb.—2 ♂♂ and 2 ♀♀, Great Ayton Moor.

New to the county list although I got females in Lonsdale five year ago.

Clubiona trivialis L.K.—Eston.

Clubiona diversa Cb.—Greenhow Botton, Redcar.

Dictyna arundinacea L.—Common. I took a ♀ adult in late February at Great Ayton.

Hahnia montana Bl.—Widely distributed but rare.

Hahnia nava Bl.—1♀ Easby Moor and 1♀ Great Ayton Moor.

Salticus cingulatus Panz.—1♂ Eston Moor.

Neon reticulatus Bl.—Basedale, Farndale, Great Ayton and Eston Moors, Turkey Nab. Common.

The following spiders occurred in every locality visited and in general were quite abundant although in some cases not adult :—

Robertus lividus Bl.
Stemonyphantes lineata L.
Leptyphantes ericaeus Bl.
L. tenuis Bl.
L. blackwallii Kulc.
L. mengii Kulc.
Poeciloneta globosa Wid.
Bathyphantes concolor Wid.
B. nigrinus Wid.
Centromerus bicolor Bl.
C. concinnus Thor.
Edothorax gibbosus Bl.
O. tuberosus Bl.
O. fuscus Bl.
Erigone atra Bl.
E. dentipalpis Wid.
Lophomma herbigradum Bl. (very abundant).
Gonatium rubens Bl.
Neriene bituberculata Wid.
Diplocephalus fuscipes Bl.
Wideria antica Wid.
Walckenaera acuminata Bl.
W. nudipalpis West.
Cornicularia unicornis Cb.
C. cuspidata Bl.
Ceratinella brevis Wid.
Drassus lapidosus Walck.
D. troglodytes C. L. K.
Clubiona reclusa Cb.
Cryphoeca silvicola C.L.K.
Coelotes atropos Walck.
Pachygnatha degeerii Sund.
P. clerckii Sund.
Meta segmentata Clerck.
Epeira quadrata Clerck.
E. diadematа Clerck.
Xysticus cristatus Clerck.
Oxyptila trux Bl.
Lycosa amentata Clerck.
Pirata piraticus Clerck.
Trochosa terricola Thor.

Prehistoric Britain. By **Robert Munro.** London : Williams & Norgate, 256 pp., price 1s. This is an addition to the Home University Library of Modern Knowledge, and the publishers are certainly to be congratulated on having secured the services of Dr. Munro to prepare this admirable book. The author begins at the Ice Age and deals with the various prehistoric periods very fully, and especially with regard to the arts, industries, monuments, and other relics by prehistoric man. The book is well illustrated.

Prehistoric Times and Men of the Channel Islands. By **Joseph Sinel.** Jersey : J. T. Bigwood, 1914, pp. 7+137, and 21 maps and plates. In this volume the curator of the museum at Jersey has brought together a remarkable record of the evidences of Early Man in the Channel Islands, and by aid of numerous photographs and sketches well illustrates the various and numerous remains of Primitive man and his associates which occur there. Not only are the relics found on the surface referred to, but the volume contains a record of the researches in the caves, burial mounds, stone monuments, submerged forests, etc. It will certainly give additional interest to the visitor to the Channel Islands. Dr. Keith writes a brief foreword. We regret that the volume is not lettered on the back, as it will cost at least a shilling to have this done.

BRITISH ORIBATIDÆ:
NOTES ON NEW AND CRITICAL SPECIES.

Rev. J. E. HULL.

(*Continued from page 220*).

O. RASTRATUS sp. n. (Plate A [Plate XX.], fig. 5).

Length about 450 μ.

This belongs to the group of which *alatus* is the type, but the pteromorphæ fall short of the middle of the cephalothorax. General colour dark vinous brown, paler near the fore margin of the dorsum; very smooth and glossy.

Cephalothorax wide at the base. Lamellæ low ridges, doubly curved, converging rapidly, nearly parallel to the sides of the cephalothorax. Lamellar setæ serrate, just reaching the tip of the rostrum, convergent and nearly horizontal. Pseudostigmatic organs long, slender, with long fusiform heads. Slightly leaning backwards. Interlamellar setæ nearly upright, serrate.

Outline of dorsum circular. Pteromorphæ projecting forward about a third of the length of the cephalothorax, striate with divergent lines which reach well up the shoulder.

Legs normal, tarsal claws 3.

Among moss and dead hawthorn leaves, Ninebanks.

O. DOMINAE sp. n. (Plate B [Plate XX.], fig. 1).

Length about 520 μ.

Red brown. Dorsum closely and finely punctured but glossy; broad oval, bordered in front. Pteromorphæ transparent. No dorsal hairs.

Cephalothorax broadly triangular; rostrum rather pointed. Lamellæ mere ridges, short, very convergent. Lamellar hair long and very strong, almost spinous. Interlamellar setæ also unusually stout, upright below, then reflexed. Pseudostigmatic organ erect, rather long, with a roughened fusiform head. First tectopedia reaching far forward, bristle-tipped.

Tarsal claws 3.

Originally sent to me by Mr. Bagnall from the coast near Whitley Bay, and later from the Derwent Valley (Durham). Since found in West Allendale on the piers of a bridge in tufts of *Bryum*.

O. LUCIFER sp. n. (Plate A, fig. 7).

Length about 330 μ.

Colour a rosy yellow, legs yellow brown. Pteromorphæ yellow, transparent.

Abdomen a broad oval; dorsum rather flat, without any hairs; median projection of fore margin straight.

Cephalothorax paler than the abdomen. Rostrum rounded, blunt. Lamellæ small short, without cusps, half the length of the lamellar setæ. Tectopedia not so conspicuous as in *O. cuspidatus*, and the pseudostigmatic organs slender, bluntly clavate, reflexed.

Tarsal claws 3. All tibiæ with long setæ.

Ninebanks: also sent from two or three localities in Durham by Mr. Bagnall and others. Exceedingly like *O. cuspidatus*, but much less active: best distinguished by the longer, more slender pseudostigmatic organs.

SCUTOVERTEX Mich.

S. MACULATUS Mich.

S. PSEUDOMACULATUS sp. n. (and variety, *insularis*). (Plate B, fig. 4).

When I first received *pseudomaculatus* from Mr. Bagnall (from rock lichen on the coast of Northumberland, near Whitley), I took it to be a variety of Michael's *maculatus* which came from a similar habitat (in Cornwall), and when further examples of *maculatus* are forthcoming that may still prove to be its true status. Meanwhile I venture to put it forward as a distinct species, as it differs most obviously from *maculatus* in certain characters, both in the nymph and in the imago. As my knowledge of the true *maculatus* is entirely drawn from Michael's description I append his characters verbatim (from 'British Oribatidæ') where they differ from the corresponding characters of *pseudomaculatus*.

S. maculatus (Michael, 'Brit. Oribatidæ').	*S. pseudomaculatus* mihi.
'Abdomen elliptical, slightly pointed posteriorly.'	Posterior margin roughly rounded, nearly truncate; certainly not in the least degree pointed.
'Ten short, thick, rather knobbed hairs round the hind margin.'	Ten posterior spinous setæ, four on each side above the margin, a pair in the middle below the margin longer than the rest; all rather thick at the base but tapering to a very sharp point.
'Pseudostigmatic organs very short, with heads broadly piriform, slightly indented at the top.'	Pseudostigmatic organs very short with globose heads (no trace of indentation at the top).

(*To be continued.*)

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Mr. Wilfrid Robinson, son of Mr. J. F. Robinson, of Hull, whose work on the lower forms of plants we have noticed from time to time, has received the degree of M.Sc. of the Manchester University.

We understand that the trustees of the Lightbown Bequest at Darwen, to whom £10,000 was left to use as they thought discreet in the establishment of a permanent memorial to the donor, have at length decided to erect a Museum and Art Gallery.

MYCOLOGY AT SANDSEND.

C. CROSSLAND,
Halifax.

JUNE 6th to 11th was spent by the major portion of the mycological committee, including its chairman, in an informal gathering at Sandsend. Saturday, Monday and Wednesday, being days when Mulgrave Woods are open by ticket to the public, the opportunity was taken to investigate them further for early fungi.

Fourteen or fifteen parasitic species in the shape of rusts were noted; among them were *Puccinia menthæ* on the stolons, or runners of *Ajuga reptans*. This fungus, as its name implies, chiefly confines its attention to the mints; the only previous British record of its occurring on *Ajuga* is by Mr. Johnston in the 'Flora of Berwick,' Vol. II., page 127.

The group Thelephoraceæ were specially sought for. These are flat, resupinate fungi that grow on decaying fallen branches, dead trunks, or worked wood. The collection was forwarded to Miss Elsie M. Wakefield, the Herbarium, Kew. Miss Wakefield is making a special study of this intricate group and welcomes freshly gathered material to work out. Of the 13 species sent, one, *Corticium microsporum* Karst., proved to be new to Britain. Another, around which there has been some doubt regarding its identity gathered here in September 1911, was found a second time and settled—*Eichleriella deglubens* (see below).

A few specimens of the remarkable *Gyrocephalus rufus*, Jacq., growing on a fallen rotting branch, hitherto unrecorded for Yorkshire, were brought in; this being a species very rarely met with was at once figured by Miss Massee.

One of the many micro-species collected was *Taphridium umbelliferarum* Karst., on decaying stem of Heracleum, not previously recorded for the British Flora. These rarities crop up unexpectedly, and go a long way towards repaying any trouble or expense that may have been connected with a visit.

While agarics were few, one very nearly came into the house to us; this was a fine *Coprinus aratus* just in its prime, springing from one of the potato-ridges in our hostess's garden. This also was figured by Miss Massee. It has only one previous county record.

Another of the few agarics was *Mycena flavipes* in a charming tuft of about twenty individuals; it was drawn and recorded from Mulgrave specimens by Mr. Massee in the 'eighties; we have met with it here several times since, but, so far as we know, it has not been found elsewhere than France.

Close search was made for micro-species. On working out the results of the visit it was found that about 140 species had been examined, nineteen being additions to the previously known mycological flora of the district. (See below).

Those marked * are new to Britain, and † new to Yorkshire.

Coprinus aratus B. and Br.
Polyporus Rostkovi Fr.
* *Corticium microsporum* Karst.
† *Eichleriella deglubens* (B. & Br.)
—*Radulum deglubens* B. & Br.
—*Radulum kmetii*, Bres.
—*Hirneolina kmetii* (Bres.), Sacc. and Trott.
† *Coniophora Berkleyi* Mass.
† *Gyrocephalus rufus* Pers.
Urocytis violae (Sow.)
† *Rhopographus pteridis* Fckl.
† *Sphærella maculiformis* (Pers.), Awd.
Sphærella pteridis (Desm.), De N.
Hypoderma comigena (Pers.)
Lophodermium pinastri (Schrad.), Chev.
Ryparobius dubius Boud.
† *Cenangium leoninum*, Cke. and Mass. On hard decorticated wood.
† *Phacidium minutissimum* Auers. On dead oak leaves.
* *Taphridium umbelliferarum*, Karst. On Heracleum.
† *Conyothyrium concentricum* Sacc. On decaying Aloes.
† *Phlyctæna vagabunda* Desm. On dead thistle.
† *Cladosporium fasciculare* Fr. On dead Monocotyledon.

ADDITIONAL HOSTS FOR YORKSHIRE.

Puccinia menthæ. On stolons of *Ajuga reptans*,
Cystopus candidus. On *Arabis alpina*.
Darluca filum Cast. On the *Æcidium* stage of *Puccinia primulæ*.

The bacterial disease on ash which sometimes kills young trees was noticed.

CORTICIUM MICROSPORUM Bourd. et Galz., in 'Bull. Soc. Myc. Fr.', XXVII., 1911=*C. byssinum* Karst. var. *microspora* Bres. in 'Ann. Myc. I.,' 1903, page 96. Exs. Brinkmann, Westf. Pilz. No. 54.

Irregularly effused on rotten wood, very thin and fragile. Hymenium when perfect smooth, forming a delicate pellicle, cream, with sometimes a faint pinkish tinge, often imperfect or cracked, showing the delicate white subiculum. Margin white, indefinite.

Basidia 4 μ wide, with 2-4 sterigmata.

Spores hyaline, minute, subglobose, 2 μ in diameter or 3 by 2 μ, often with one small oil-drop.

Subhymenical hyphae 1-2 μ in diameter. Basal hyphae 3-5 μ, with clamp connections, sometimes encrusted with crystals.

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Part X. of Volume 33 of *The Transactions of the Manchester Geological and Mining Society*, contains a remarkable paper by Mr. J. Lomax, entitled 'Further Researches in the Microscopical Examination of Coal, especially in relation to Spontaneous Combustion.' It is illustrated by 60 reproductions of photo-micrographs of sections of coal from Lancashire, Yorkshire, etc.

YORKSHIRE NATURALISTS AT FILEY.

(*Continued from page 225*).

Mycological.—Mr. T. B. Roe writes :—Filey is not by any means an ideal hunting ground for the mycologist, nevertheless, by diligent searching, and by the assistance of Mr. R. Fowler Jones and Mr. Ackroyd, several interesting species were found, mostly microscopic, and a good proportion being ' rusts.' The cliffs to the south of the town were examined, also a ravine and some small ponds in the undercliff.

In the ravine by the side of a small beck the æcidia of *Puccinia pulverulenta* Grev., were in abundance on *Epilobium hirsutum*, and also *Puccinia caricis* Reb. in the uredo stage on *Carex acutiformis*. In many of the flowers of *Lychnis diurna* the anthers were smutted with *Ustilago violacea* Pers. On the slope of the ravine *Puccinia betonicæ* D.C. occurred in quantity, the reddish-brown teleutospores being easily noticeable. Here also was found *Ramularia primulæ* Thum. on *Primula vulgaris*.

The ash-trees were noticed to be badly attacked by ash-canker, a bacterial disease causing great damage to, and often destroying them, particularly when young.

By the side of the ponds two interesting little discomycetes were found, *Dasyscypha diminuta* (Rob.) Sacc. on dead *Juncus*, and *D. conformis* Sacc. on dead *Equisetum*. The St. George's mushroom, *Tricholoma gambosum* Fr. was collected in the grass near the ponds, and on the leaves of *Menyanthes trifoliata*, *Protomyces menyanthis* De Bary was found. The most interesting species obtained was *Uromyces flectens* Lagerh. on *Trifolium repens*. This species is new to Yorkshire. It differs from *U. trifolii* in the larger sori and in having only the teleutospore stage.

Of the thirty-four species collected the following are new records for the Filey district included under C.D. (South-East).

† *Hypholoma capnoides* Fr.
Coleosporium senecionis Pers.
*† *Uromyces flectens* Lagerh. on *Trifolium repens*.
† *Puccinia graminis* Pers. on *Dactylis glomerata*.
Puccinia valantiae Pers. on *Galium Cruciata*.
Phragmidium sanguisorbae D.C.
Triphragmium ulmariae Schum.
Ustilago violacea Pers.
† *Protomyces menyanthis* De Bary.
† *Hysterographium fraxini* De Not.
† *Dasyscypha diminuta* (Rob.) Sacc.
† ,, *conformis* Sacc.
Phyllachora graminis Fr.
† ,, *pteridis* Rob.
Epichloë typhina Pers.
† *Dinemasporium graminum* Lév. on dead *Festuca ovina*.
† *Ramularia primulae* Thum.
† *Trichosporium fuscum* Sacc, on dead *Ulmus*.

* = New to Yorkshire. † = New to Vice-County S.E.

Neuroptera and Trichoptera.—Mr. G. T. Porritt reports that in consequence of the cold weather, and the scarcity of fresh water, very few insects in these orders were

to be found. One very interesting species turned up, however, in *Nemoura inconspicua* which occurred commonly on a narrow beck which runs down to the sea shore on the cliffs south of Filey, and is a new record for the county. *Silo pallipes* occurred in the same spot ; as did also the fine Hymenopterous sawfly, *Trichiosoma lucorum* about hawthorn. On the small pond on the cliffs beyond there, *Ischnura elegans* and *Grammotaulius atomarius* were taken, and *Nemoura variegata* was common.

Marine Biology.—The Rev. F. H. Woods writes :—The tides were not suitable for shore work, but Dr. Irving, who on Saturday made a careful examination of rocks and pools at the neck of the Spittal gives the following account of its results. 'I found many species, reported last September, which need not be enumerated. *Doto coronata*, several good specimens occurred among the *Sertularia* attached to *Chondrus*. I found one bright specimen of the rare anemone *Sagartia venusta*. A somewhat unusual variety of *Sagartia troglodytes* I detached from a limestone rock. A small specimen of an æolid *Coryphella rufibranchialis* (*gracilis*) may likewise be added to the list.'

My own share of the work was practically confined to the microscopic study of drift. Altogether I discovered 73 species of shell molluscs, of which 70 occurred, though not exclusively, in the drift. It is interesting to note that, though none of them are new to Filey, they include five out of the six additions to the Marine Fauna of Filey mentioned in *The Naturalist* for April, p. 130, the exception being *Nuculana pygmaea*. But some of them are worn or fragmentary. Among other rare shells may be noted *Astarte compressa* and a minute specimen of *Ondina obliqua*. The latter is seldom to be found except in a very young condition on the Yorkshire coast. I also noticed a very young specimen of *Sepiola scandica* among the debris from the shrimp nets. This should also be added to the Filey list.

At the evening meeting on Saturday a very useful suggestion was made that those living at or near the coast should occasionally send parcels of shell sand or fine drift to those working at a distance. Mr. Foster Smith, the Headmaster of the Church School at Filey, has kindly consented to act as purveyor, and the secretaries of local societies, who wish to take up the work, would do well to communicate with him. It should be realised, however, that some care should be exercised in choosing the material, which should be neither too fine nor too coarse. If it contains any shells, it probably contains many and of many kinds. I seldom find less than 60 species in say a quart of drift.

Conchology.—Mr. Thomas Castle writes:—With the exception of a valley on the wolds leading down into the site of the ancient lake in the Pickering Valley where *Helix aspersa* and *H. nemoralis* abounded, almost all species were scarce in numbers, and diligent search had to be made at the roots of grasses, etc., for most of those enumerated below, the exception being *Succinea elegans* which is located near the moist places on the cliffs of Boulder clay. Several ponds yielded fresh-water types, but such species as *Limnæa peregra* and *L. palustris* were not up to the standard met with on previous occasions.

Helix aspersa.
H. nemoralis, var. *libellula* band formula 1-2, 3-4, 5.
H. nemoralis, var. *libellula* band formula (1-2), 3-(4-5).
H. nemoralis, var. *libellula* band formula 1, 2, 3,-(4-5).
H. nemoralis, var. *libellula* band formula (1-2, 3), (4-5).
H. nemoralis, var. *rubella* band formula 1-2-3-4-5.
H. nemoralis, var. *rubella* band formula (1-2, 3-4-5).
Helicella itala.
,, *virgata.*
Candidula caperata.
Hygromia hispida.
,, *rufescens.*
Vitrina pellucida.
Polita cellaria.
,, *nitidula.*
Cochlicopa lubrica.
Lauria cylindracea.
Succinea elegans.
Limnæa peregra.
,, *palustris.*
,, *truncatula.*
Planorbis vortex.
,, *spirorbis.*
Pisidium fontinale.

Rev. F. H. Woods states that *Acroloxus lacustris* was found in considerable quantities on the stems of *Potamogeton natans* in a pond on the coast south of Filey.

Geology.—Mr. Stather writes:—The geologists had a very pleasant time at Filey. On Saturday, Filey Brig and Carr Naze were carefully explored. Characteristic fossils were secured from the upper layers of the Calcareous Grit, and, on the hard beds immediately under the Boulder Clay, glacial striæ were traced, and many striking instances of 'terminal curvature' were noted. Far-travelled pebbles and boulders from the Glacial Clays were collected, including a specimen of Shap Granite. On the top of the Naze indications of a kitchen midden were seen, probably dating back to Roman times. The site of the Filey old Spa Well, so much in vogue a century ago was also visited, and the little stream of rusty-coloured Spa water was still oozing from the adjacent Boulder Clays.

From the crest of the great bank of Boulder Clay near the Spa Well a very fine and comprehensive view of the Yorkshire coast and district was obtained.

On Sunday a trip was taken inland, the route being through the villages of Muston, Flotmanby, Flixton, Forden, North Burton and Hunmanby. From Filey to Muston the road passes over the hummocky ground composed of morainic material, the product of the great glaciers which once filled the North Sea basin. Westward from Muston, the drifts gradually

thin out, and along the route, which now skirted the old Lake Pickering with the chalk escarpment on the left, little or no trace of drift material could be seen. Turning northwards and ascending the escarpment at Flixton, a halt was made in a chalk quarry, halfway up the hill, to examine an exposure of the black *Belemnitella plena* Marls. These beds divide the Middle Chalk from the Lower, have a distinct fauna of their own, and can be traced as far south as Eastbourne. Looking northward from the summit of the escarpment, very fine views were obtained of the site of Lake Pickering, and the Oolitic Uplands beyond, and from this point of vantage Dr. Woodhead gave his address already referred to.

From here a southward path was taken in the direction of Forden, which was reached after a tramp of three or four miles along a typically winding Wold Dale. The curious structure and appearance of these dales and rounded wolds was much appreciated by many members who had not previously seen them, and an interesting discussion ensued as to their probable origin.

On Monday the cliffs between Carr Naze and Cayton Bay were explored. As the party proceeded northwards the rocks were seen to gradually rise in the cliffs until at Gristhorpe almost the whole series of the Lower and Middle Oolites were exposed. At Yons Nab the well-known Gristhorpe Plant Bed was located and many good specimens obtained.

The following is a list of the finds supplied by Messrs. W. R. Barker and C. Bradshaw:—*Williamsonia pecten, Lycopodites falcatus, Taeniopteris vittata, Nilssonia compta, Cladophlebis denticulata, Sphenopteris* sp., *Equisetites* sp., two species of ferns in fructification (unidentified), and a seed probably belonging to one of the *Cycads.*

We are indebted to the North Eastern Railway Company for the fine photographs reproduced on Plate XXI.

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The Fourteenth Annual Report of the Art Gallery and Museums Committee of Cheltenham contains eight plates illustrating flint implements but whether these succeed in demonstrating that there was intercourse between Gloucester and Ireland in neolithic times, on account of the similarity of the specimens found in the two areas, is another matter. Judging from the Gloucester examples figured, many others in this country could easily make a similar claim.

The Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Volume 58, Part 1, contain the following interesting papers:—'The old Manchester Natural History Society and its Museums,' by the President, Francis Nicholson; 'Changes in the branchial lamellae of *Ligia oceanica* after prolonged immersion in fresh and salt water,' by Dorothy A. Stewart; 'Note on some products isolated from Soot,' by Professor E. Knecht and Eva Hibbert; 'The Willow Titmouse in Lancashire and Cheshire,' by T. A. Coward.

In Memoriam.

WILLIAM WEST, F.L.S., 1848—1914.

(*Continued from page 230*).

But these algological reseaches did not by any means exhaust the potentialities of the subject, and led up to another line of study, that of the Phytoplankton of lakes and rivers. In this the two Wests were pioneers, the first British workers, and they took it up in a characteristically full and systematic manner. Aided by various grants from the Government Grant Fund and the Royal Irish Academy, the detailed investigations were commenced about 1900, and western and southern Scotland, the English and North Welsh Lakes, those of western and south western Ireland, as well as Lough Neagh, Malham Tarn, and the Rivers Ouse, Lochay and Bann were visited during the holiday seasons of several years.

The results of these plankton researches proved to be of high importance and are summarized in the Proceedings of the Royal Society for 1909. From the biological point of view the British lakes proved to be of surpassing interest, and the researches of the Wests show that the lake-plankton of Britain and extreme Western Europe differs completely from that of Central Europe, being characterized by the presence and dominance of Desmids. The Wests further showed that Desmid-plankton only occurred in the lakes of rich desmid-areas, also that these were directly correlated with montane regions, areas of heavy and persistent rainfall, and—most important of all—depended upon the presence of the oldest rocks, Archæan and the older Palæozoic rock formations, so that their success in following up this line of investigation produced significant results of high scientific value—which proved a perfect revelation and surprise to the algologists of Europe.

William West was elected a Fellow of the Linnean Society on the 17th March, 1887, being at the time of his death the only one resident in Bradford.

He was a member of the British Association and a not infrequent attender at its meetings, one of the secretaries of Section K at the Bradford meeting in 1900, and ever-welcome in what the late C. P. Hobkirk used to call the 'Yorkshire corner' of the reception and smoke-rooms, along with such men as Hobkirk himself, Teasdale, M. B. Slater, Davis, Cash, Cheeseman, Wager and others. The present President of the Yorkshire Naturalists' Union recalls the pleasantness of these gatherings of old friends, and that West's remarks on topics under discussion at the Association were sound and just, genial and charitable, as befitted his sympathetic and generous

disposition. The last occasion was at Birmingham in 1913, when, at the Conference of Delegates, the two of them had to contend for the principle of letting well alone with regard to measures proposed for the preservation of plants in their habitats, and never did West speak so forcibly as then. To many the future meetings of the Association will lack the charm which his presence lent.

Many a tribute has been paid to his knowledge, his perseverance (no one ever wasted time less), the excellence of his work, his scientific acumen, and although honorary academic recognition did not come his way, he and his work have been fully appreciated by all who knew his worth, and many an organism has been named in his honour.

His personality was not the least noticeable of his characteristics, and was such as to endear him to all who came into contact with him. No dry-as-dust was he, even though his study was of microscopic algæ and their scientific nomenclature. He was a man of warm enthusiasms, with a singular charm of manner and a quiet vein of geniality and humour running through his whole disposition, and those who, like the present writer, have been on terms of intimacy with him for nearly forty years and watched the parental training of his family during that period, can best appreciate what manner of man he was, and feel the greatness of the loss which has fallen upon us. A premature loss it was, for one had pictured him retiring from his arduous teaching career and devoting the evening of his days to elaborating and completing the labours of his life-time. But it was not to be—he died in harness, teaching to within a fortnight of the May morning on which he succumbed to heart failure supervening upon an attack of asthma.

The final scene was at Scholemoor cemetery, Bradford, where he was followed to his grave by large numbers of his pupils and his old friends, and in the spirit by many more.

List of Papers by W. West.

On Mosses. *The Naturalist*, July and August, 1878, p. 182, etc.
The Autumn Flora of Whernside (with F. Arnold Lees). *The Naturalist*, April, 1879.
Further additions to Mr. W. B. Turner's List of Algæ. *The Naturalist*, March, 1880, p. 116.
Bryological Notes. *The Naturalist*, Nov. 1880, p. 53.
Additions to West Riding Flora. *The Naturalist*, Nov. 1880, p. 60.
Bucks. Lichens. *The Naturalist*, Dec. 1880, p. 69.
Cryptogamic Report of Yorkshire Naturalists' Union for 1880. *The Naturalist*, April 1881, *et sequitur*.
A Stroll near Baildon in February. *The Naturalist*, 1881, p. 125.
The Principal Plants of Malham. *The Naturalist*, 1883, p. 25, etc.
Plant Gossip. *Nat. World*, 1884 and 1885.
Plants of the Bradford District. *The Naturalist*, March 1885, p. 178 (with H. T. Soppitt).

Habitats of Freshwater Algæ. *The Naturalist*, May 1885, p. 232.
Pilularia globulifera in Westmorland. *Journ. Bot.*, Jan. 1886, xxiv, 24.
Bradford Naturalists' Society—A Year's Botanical Work. *The Naturalist*, Feb. 1886, p. 60 (with H. T. Soppitt).
Additions to Flora of West Yorkshire. *The Naturalist*, Oct. 1888.
Goodyera repens near Market Weighton. *The Naturalist*, Oct. 1888, p. 312.
The Desmids of Maine. *Journ. Bot.* xxvi. Nov. 1888.
Additions to the Algæ of West Yorkshire. *The Naturalist*, March and April, 1889.
List of Desmids from Massachusetts, U.S.A. *Journ. R. Micr. Soc.*, 1889.
The Freshwater Algæ of Maine. *Journ. Bot.* xxvii, July, 1889.
Algæ in Upper Swaledale. *The Naturalist*, Aug. 1889, p. 246.
The Freshwater Algæ of North Yorkshire. *Journ. Bot.* xxvii, Oct. 1889.
Sciadium arbuscula A. Braun. *Journ. Bot.*, April 1890, p. 121.
A Contribution to the Freshwater Algæ of North Wales. *Journ. Roy. Micr. Soc.* June, 1890.
Conjugation of the Zygnemaceæ. *Neptunia*, 1891, vol. 1.
Sedum Rhodiola D.C. *The Naturalist*, May 1891, p. 139.
The Towton Rose. *Journ. Bot.*, Nov. 1891, p. 346.
The Freshwater Algæ of Maine. *Journ. Bot.*, xxix, Dec. 1891.
Additions to the Freshwater Algæ of West Yorkshire. *The Naturalist*, Aug. 1891.
Notes on Danish Algæ. *La Nuova Notarisia*. ser. 2, 1891.
A Contribution to the Freshwater Algæ of West Ireland. *Journ. Linn. Soc. Bot.* xxix, 1892.
Nonnullæ algæ aquæ dulcis Lusitanicæ. *La Notarisia*, vii, 1892.
Algæ of the English Lake District. *Journ. Roy. Micr. Soc.* 1892.
Notes on Scotch Freshwater Algæ. *Journ. Bot.*, April 1893.
On some Freshwater Algæ from the West Indies. *Journ. Linn. Soc. Bot.*, July 1894, xxx.
Mural Ecology. *Journ. Bot.*, Feb. 1911.
Notes on the Flora of Shetland, with some Ecological Observations. *Journ. Bot.*, Sept.-Oct. 1912.
The Freshwater Algæ of Clare Island. *Clare Island Survey*, Part 16, 1912, pp. 62 and 2 plates.
Freshwater Algæ in Miss L. S. Gibbs' Flora and Plant Formations of Mount Kinabalu and British North Borneo. *Journ. Linn. Soc. Bot.* xlii, 1914, pp. 216-239.

ALGÆ PAPERS PUBLISHED IN CONJUNCTION WITH PROF. G. S. WEST.

Freshwater Algæ of the East Riding of Yorkshire. *The Naturalist*, July 1893.
New British Freshwater Algæ. *Journ. Roy. Micr. Soc.* 1894.
New American Algæ. *Journ. Bot.*, Feb. 1895, p. 52.
Some recently published Desmidieæ. *Journ. Bot.* xxxiii, March, 1895.
The Freshwater Algæ of Madagascar. *Trans. Linn. Soc. Bot.*, ser. 2, v. 1895, pp. 41-90, plates 5-9.
On some New and Interesting Freshwater Algæ. *Journ. Roy. Micr. Soc.*, 1896, pp. 149-165, plates 3-4.
Notes on recently published Desmidieæ. *Journ. Bot.*, Aug. 1896.
Algæ from Central Africa. *Journ. Bot.*, Sept. 1896, pp. 377-384, plate 361.
On some North American Desmidieæ. *Trans. Linn. Soc. Bot.*, ser. 2, v. 1896, pp. 229-274, plates 12-18.
On the Collection of Freshwater Algæ. *The Naturalist*, May 1897.
Desmids from Singapore. *Journ. Linn. Soc. Bot.* xxxiii, 1897, pp. 156-167, plates 8-9.

1914 Aug. 1.

Welwitsch's African Freshwater Algæ. *Journ. Bot.*, 1897, 78 pages, and 6 plates.

A Contribution to the Freshwater Algæ of the South of England. *Journ. Roy. Micr. Soc.* 1897, pp. 467-511, plates 6-7.

On some Desmids of the United States. *Journ. Linn. Soc. Bot.* xxxiii, 1898, pp. 279-322, plates 16-18, and 7 text-figures.

Observations on the Conjugatæ. *Annals of Botany*, Mar. 1898, pp. 29-58 plates 4-5.

Notes on Freshwater Algæ, I.—III. *Journ. Bot.* 1988, 1900, and 1903.

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The Alga-flora of Yorkshire. *Trans. Yorks. Nat. Union*, vol. v. (1900-1901).

The Freshwater Chlorophyceæ of the Koh Chang. *Botanisk Tidsskrift*, xxiv, 1901, pp. 73-102, plates 2-4.

A Contribution to the Freshwater Algæ of Ceylon. *Trans. Linn. Soc. Bot.*, ser. 2, vi, 1902, pp. 123-215, plates 17-22.

A Contribution to the Freshwater Algæ of the North of Ireland. *Trans. Roy. Irish Acad.* xxxii, sect. B, Part i, 1902, pp. 1-90, plates 1-3.

Scottish Freshwater Plankton—I. *Journ. Linn. Soc. Bot.* xxxv. 1903, pp. 519-556, plates 14-18.

A Monograph of the British Desmidiaceæ. *Ray Society.* Vol. I., 1904; pp. 224+64, and 32 plates; Vol. II., 1905; pp. 206+64, and 32 plates; Vol. III., 1908; pp. 274+62, and 31 plates; Vol. IV., 1911; pp. 194+66, and 33 plates. (As yet unfinished).

A further Contribution to the Freshwater Plankton of the Scottish Lochs. *Trans. Roy. Soc. Edin.*, xli., Part iii., 1905, pp. 477-518, plates 1-7.

Freshwater Algæ of the Orkneys and Shetlands. *Trans. Bot. Soc. Edin.*, 1904 (1905), pp. 1-41, plates 1-2.

A Comparative Study of the Plankton of some Irish Lakes. *Trans. Roy. Irish Acad.*, xxxiii., sect. B., Part ii., 1906, pp. 77-116, plates 6-11.

Freshwater Algæ from Burma, including a few from Bengal and Madras. *Ann. Roy. Bot. Gardens, Calcutta*, vol. vi., part ii., 1907, pp. 175-260, plates 10-16.

The Phytoplankton of the English Lake District. *The Naturalist*, 1909.

The British Freshwater Phytoplankton. *Proc. Roy. Soc.* 1909.

The Freshwater Algæ of the British Antarctic Expedition, conducted by Sir E. Shackleton, 1907-9. *Biology Results*, vol. i., Part vii, 1911.

On the Periodicity of the Phytoplankton of some British Lakes. *Journ. Linn. Soc. Bot.*, xl., 1912, pp. 395-432, 1 plates and 4 text-figures.

An article by W. West alone on the the ecology of cryptogams was read posthumously at the meeting of the Linnean Society on the 18th of June.

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In *The Zoologist* for July, Mr. H. Panton writes on the 'Relationship of Species.'

A Note on the Mice of St. Kilda, by W. Eagle Clarke, appears in the *Scottish Naturalist* for June.

In completing his articles on 'Museums and Education,' Mr. Wilfred Mark Webb gives in *Knowledge* for July details of the frames which he has designed for the building up of school museums on the unit system in the case of dried specimens mounted in glass-topped boxes. He also publishes a diagram of a simple modification of one of the methods used on the living side of museums for aerating marine aquaria. The details are of particular interest to nature-study teachers and school natural history societies.

REVIEWS AND BOOK NOTICES.

NEW BOOKS ON GEOLOGY.

The continued popularity of the science of Geology is shown by the extraordinary number of books published dealing with every possible branch of geological research. The extraordinary variety of subjects is shown by the following volumes, which happen to be on our desk at the moment :—

A recent addition to Dent's remarkably cheap 'Every Man's Library,' is the **Geological evidence of the antiquity of man**, by **Sir Charles Lyell**, which has an introduction by Mr. R. H. Rastell, who has made such alterations to the original work as he considers necessary in order to bring it up to date. That such a work, containing xx+ 407 pages of carefully printed matter, with illustrations, and nicely bound in cloth, should be sold at 1s. is surely an achievement upon which the publishers, Messrs J. M. Dent & Sons, should be heartily congratulated. The sale of the book should certainly be such as to encourage them in their enterprise.

The Maintenance of Foreshores. By **E. Latham**. London : Crosby & Lockwood. 1914, 84 pp., 2s. net. In this work the author has had the advantage of the assistance of Colonel Crompton, and Mr. A. E. Carey, and he gives a valuable summary of our knowledge of the Protection and Drainage of Low-Lying Lands ; the Surfacing of Promenades ; Protecting High Lands ; and the various forms of Coast Erosion. Another useful feature is a summary of The Findings of the Royal Commission on Coast Erosion. From his descriptions and references the author is obviously familiar with the literature on the subject, and he also gives valuable information with regard to Materials and Construction of Foreshore Protective Works.

Practical Instructions in the Search for, and the Determination of, the Useful Minerals, Including the Rare Ores. For the Prospector, Miner, and as a Ready Reference for Everybody Interested in the Mineral Industry. By **A. McLeod.** London : Chapman & Hall, Ltd., 1914, 114 pp., 5s. 6d. net. With this somewhat comprehensive title, the work is fairly described. The author deals with the A.B.C. of the useful Minerals ; Hints on deciding the Preliminary Examination, and so on. His descriptions are such that in most cases the prospector will be able to form an idea of the nature of any strange minerals he meets with. The book is small and has rounded corners, and possibly the comparatively high price of 5s. 6d. is accounted for by the fact that it is bound in leather.

The Text Book of Geology. By **Professor James Park.** London : Charles Griffin & Company, pp. xv+ 598, 15s. net. This excellent manual is written by the Professor of Mining in the University of Otago, New Zealand, for use in mining schools, colleges, and secondary schools. In a series of 36 admirable chapters he deals very fully indeed with the first principles and scope of the science, denudation, the work of rivers, glaciers, and the sea, rock building, rock structures, earth movements, and various and numerous other phases of geological history. There is an admirable chapter on the occurrence, preservation, classification and uses of fossils, and then a series of essays dealing with the different geological formations from the earliest times to the present. The second part of the work is devoted to Economic Geology, Field Work, and Geological Surveying. There are various valuable appendices and a bibliography. It is very well printed, on good paper, is illustrated by nearly 300 blocks from sketches and photographs which have apparently been very carefully chosen, and there is an admirable index.

Structural Geology. By **C. L. Leith.** London : Constable & Co., 169 pp., 6s. 6d. net. The author of this book is at the University of

Wisconsin, and hence many of the illustrations are drawn from American sources. The main evidences, however, upon which the book is based, apply to almost any country, and there is no doubt that the volume will appeal to British workers. 'The structural geologist has, in recent years, found it necessary in his field of work to give much attention to the genetic relationships of rock structures produced by deformation. Some of these relationships have not yet found expression in the available literature on the subject. The student reads in general text books about individual structures but seldom of their relations, with the result that at least in his early field work he may fail to utilize methods which are helpful or essential in the interpretation of the geology of a district. Emphasis upon geological structures as related parts of a record or process rather than as isolated facts determine the method of presentation in this book.' There are 68 illustrations from sketches and photographs, which considerably add to the clearness of the descriptions, those of the numerous experiments being very striking.

BOOKS ON WATER SUPPLY.

Clean Water and How to get it. By **Allen Hazen.** London: Chapman & Hall, 1914, pp. 196, 6s. 6d. net. This volume was evidently written by the author while visiting the Brisbane Board of Waterworks. It is devoted to a technical account of the means adopted by the American cities to secure pure water. After dealing with the various reservoirs, etc., it refers to stagnation, turbidity, tuberculation, coagulation, sedimentation, purification, etc. The facts and figures given and the numerous illustrations will doubtless provide much material of value to waterworks' engineers.

Water: Its Purification and use in the Industries. By **W. W. Christie.** London: Constable & Co. 219 pp., 8s. 6d. net. This volume is largely reprinted from 'Industrial Engineering and Engineering Digest.' It is mostly drawn from American examples, and deals with Water Softening, Filter Water, Erosion, Measurement of Water, and numerous other aspects of this important question. It is fairly well illustrated by very careful drawings, and photographs, some of which are coloured, and will particularly appeal to manufacturers and other large consumers, in the practical information it gives.

Studies in Water Supply. By **A. C. Houston, D.Sc.** Macmillan & Co., London. 203 pp, 5s. net. This work is not a text-book, but rather a monograph dealing with the author's own personal experiences and investigations. As Director of the Water Examination Department of the Metropolitan Water Board, the author has a very high standing, and his experiences in various parts of the country make this volume of peculiar value. The book is not an elementary treatise nor does it profess to be. It is packed with statistics, diagrams, and tables, which are specially valuable, and the author and publishers are to be congratulated on so much information being brought together within so small a compass. Among the special subjects are the Sources of Water Supply, Abstraction, The Supplementary Processes of Purification, Sterilisation, Storage, Water and Disease, The Financial Aspect of Water Supply, Bacteriological Methods, etc.

The Microscopy of Drinking Water. By **G. C. Whipple.** London: Chapman and Hall, 1914, 409 pp., 17s. net. This book is by the Professor of Sanitary Engineering at Harvard University, and while it is naturally largely of interest to our American cousins, it contains much that is of value to those concerned in our water supply at Home. This book has a twofold purpose. It is intended primarily to serve as a guide to the water analyst and the water-works' engineer, describing the methods of

microscopical examination, assisting in the identification of the common microscopic organisms found in drinking water, and interpreting the results in the light of environmental studies. Its second purpose is to stimulate a greater interest in the study of microscopic aquatic life and general limnology from the practical and economic standpoint. As the present is the third edition, the success of the work is demonstrated. We can only say that it is exceptionally thorough, and every possible point appears to have been illustrated with diagram or photographs, while the coloured plates represent the more important organic contents of water, such as Diatoms. Rotifera, etc.

Waves of Sand and Snow and the Eddies which make them. By **Vaughan Cornish.** London: Fisher Unwin, 383 pp., 10s. net. Those who are familiar with Dr. Vaughan Cornish's lectures and the numerous beautiful photographs with which he illustrates them, will be glad to have the present volume in which so many of them have been reproduced. The marvel is that the author has brought together so much information and so many interesting facts relating to so special a subject. He commences with an account of desert sand dunes which will certainly appeal to geologists interested in the Trias and other sandstone formations. He shows that sand ripples in the form of enormous dunes can be a very serious geological factor, inasmuch as in some cases they are shown to have entirely covered up large forests. On snow waves, and snow ripples he also gives much valuable information of a like kind, and many of the photographs and illustrations he gives are truly remarkable; the snow mushrooms, nine feet across, suspended from the tops of telegraph poles, etc., being specially noteworthy. The second part of the volume deals with the ripple marks and current marks, and illustrates many curious forms of ripples, and describes their origin and formation. The final part of the book refers to miniature deltas and 'mackerel skies.' There is a bibliography and a brief index. The author appears to have travelled widely in order to obtain material for his volume, which we can safely say is the most complete treatise of this very difficult subject.

Plant Life in the British Isles, by **A. R. Horwood**. J. and A. Churchill, pp. xiv. and 254. Price 6/6 net. The author's aim in writing this book is to introduce the beginner to the better known orders of British plants and interest them in the life histories of the commoner species. The features of the larger groups are first dealt with and then follow brief accounts of representative and common species. Stress is laid on habitat and the importance of this on distribution, and much of interest is given about many of our wild plants. Curiously enough, the author seems to have overlooked several species whose structures, forms, and life histories are of the greatest importance in relation to habitat, and whose peculiarities of distribution, as well as the great area they cover, present the most interesting problems in British vegetation. The introductory chapter is rather loosely written and unsafe to place in the hands of young students, *e.g.*, on page 10 we are told that one of the functions of leaves is 'the conveyance of moisture to the roots,' and that 'there is no arrangement to convey water' in water plants. On page 11 he says that the 'Buttercup Group has a batrachian section from which the land forms have been derived,' while on page 42 he says that *Ranunculus repens* is a further example of a transitional form of buttercup leading on to the water buttercups.' On page 22 we learn that a flower 'is fertilised by the passage of the pollen grains down the stigma and the style to the ovary.' The fruits of composites are said to be 'the product of a single carpel,' and that the fruits of the Willow herbs are 'provided with a tuft of hairs.' The book is illustrated by 73 photographs, most of which are quite good, but fig. 12 though it might serve as an illustration of a fruiting branch, certainly does not show the 'Flowers of the Lime.'

NEWS FROM THE MAGAZINES, etc.

In the *Selborne Magazine* for July is an illustrated account of Sussex Draught Oxen.

In *The Museums Journal* for July is an account of the Wilton Park Museum, Batley, Yorks.

The Lancashire Naturalist has now been incorporated in *The Lancashire and Cheshire Naturalist.*

Mr. A. P. Long has an article on the Cricket Bat Willow in *The Journal of the Board of Agriculture* for July.

Camping for May is principally interesting from the reproductions of weird drawings which it contains.

British Birds for July contains a paper by S. E. Brock on 'The Ecological Relations of Bird-Distribution.'

A note on the Numerical Ratio of the two Sexes of the Lesser Horse-Shoe Bat, appears in *The Irish Naturalist* for July.

In the *Journal of Conchology* for July are papers on the Radula of Hyalinia, and on the Candidula Section of Helicella.

The *Welsh National Museum* has issued a valuable illustrated Catalogue of an Exhibition of works by certain Modern Artists of Welsh birth or extraction.

The *Colchester Museum* has recently issued its report for the year ended 31st March, 1914. It contains many valuable illustrations of the pre-historic and later objects presented to the Museum.

In *The Proceedings of the Geologists' Association* (Vol. XXV., Part 3,) Mr. P. G. H. Boswell has a paper 'On the occurrence of the North Sea Drift (Lower Glacial) and certain other Brick-earths in Suffolk.'

In *Man* for July is a report on the description of a flat Bronze Celt in the Newbury Museum, which is very similar in type to many found in North countries; the analysis shows that the alloy consists of 91.3 parts of copper, and 8.3 parts of tin.

In the *Entomologist's Record* for July and August, Mr. G. T. Bethune-Baker prints his paper on 'The Correlation of Pattern and Structure in Rhopalocera with Special Reference to the Ruralidæ,' which was read at the Birmingham meeting of the British Association. It is illustrated by seven plates.

In *The Entomologist's Monthly Magazine* for March, there is a note on Deformed antennæ in beetles taken at Spurn; some new and rare records of beetles in Yorkshire and Durham. *Sirex juvencus* L., and *Monochammus sartor* L., in Yorkshire, and a note on some extreme forms of v. *nigrosparsata* of *Abraxas grossulariata* from Huddersfield.

We understand from *The Lancashire Naturalist* that some of the pre-historic remains found at Darwen and lodged in the Liverpool Museum by the Historical Society of Lancashire and Cheshire were thought to have been neglected, and that after negotiations with the society the collection has been handed over to the Darwen authorities, and has been placed in the library there.

The Journal of the Quekett Microscopical Club, Volume XII., No. 74, contains the Presidential Address by Dr. A. Dendy, on 'Organisms and Origins'; Mr. James Burton writes on the Disc-like Termination of the Flagellum of some Euglenae; Mr. N. E. Brown, on the Structure of Diatoms, and there are numerous papers dealing with the technical aspect of microscopical work.

At last two pen and ink portraits of Gilbert White, the author of the History of Selborne, have been found, which are considered by the authorities to be authentic. They occur in a copy of Pope's translations of the Iliad, and were presented to Gilbert White by the author in 1743. The volumes have been secured by the British Museum, and the portraits reproduced in *The Selborne Magazine* for July.

NOTES AND COMMENTS.

ANTIQUARY V. ANTIQUARIAN.

We have always tried to distinguish between an ' antiquary ' and an ' antiquarian.' It seems that a few years ago six gold nobles of Edward III. were found together just under the turf near Calder Abbey. They may have got there, of course, in a number of different ways, but a writer, evidently an ' antiquarian ' (not an antiquary), in the recent volume of the Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society, gives the following extraordinary theory :—' We may imagine some knavish varlet—a lay brother if you will—having stolen the coins from the Abbey, fleeing over the fell rich with a purchasing power of quite £50 in the present day, and avoiding the usual track. He arrives breathless at the little stream and sinks down to rest and drink. Sitting up he looks back, no one is in sight, all seems well. From his wallet he draws his ill-got gain and gloats over it. Again he looks round ; all is quiet, the sun is hot, his hand sinks by his side and he mechanically places the coins in a pile beside him. Almost drowsing in the heat, he suddenly starts, bounds up ; there is a sound of distant shouting and barking of dogs. Away he runs over beck and brow forgetful of his treasure, away round the friendly shoulder of the hill. How far does he get before he discovers his loss ? What becomes of him ? Caught or not, one thing is clear, he never came back.' We are equally certain he never went !

MEDULLOSA PUSILLA.

In *The Proceedings of the Royal Society*, B. Vol. 87, Dr. D. H. Scott has a valuable paper on *Medullosa pusilla.* This species somewhat resembles *M. anglica.* It is small (the stem with the leaf bases not exceeding 2 cm. in diameter), and was found by Mr. P. Walley in the soap-stone which occurs immediately above the Halifax Hard-bed in the Harkhill Pit, Colne, Lancs. Beautiful illustrations showing the structure of this species are given, together with a detailed description, from which it seems clear that the new plant greatly resembles *M. anglica,* except in size, and we note that even Dr. Scott himself questions whether it is worth while to separate the species on the ground of size alone, as it may be from the basal part of the stem, or merely a dwarf plant.

THE BRITISH ASSOCIATION.

We learn from *The Yorkshire Observer* that the bloodless battles of the great scientific parliament—the British Association for the Advancement of Science—reach us in England only in faint echo this year across the oceans and amid the din of material warfare. But it is characteristic of the fact that

science knows no nationalism, that the large body of scientists who have gone forth from these shores to Australia, the not less loyal sons of Britain who are the hosts of the occasion, can sit down with no inconsiderable party of German scientists in amicable and courteous discussion while strife reigns rampant at home. The eclipse which the meeting suffers in attention this year is not the less regrettable because Yorkshire has one of her scientific sons in the presidential chair. There have not been a great many Yorkshiremen called to that high office, though the Association itself was born in our county. It is all the more to be regretted since Dr. Bateson, the new president, is undertaking a pretty considerable enterprise—namely, to depose Darwin from his high position in the regard of biologists and to set forth a new origin of species. Of course Darwin has been assailed before in meetings of the British Association, but Dr. Bateson is certain that he has conquered the obstinate fortress this time, and reduced Darwinism to its due proportions —a triusm where it is true and for the rest very wrong. That which Dr. Bateson proposes to establish as the real origin of species—a kind of spontaneous variation in jumps, modified by cross-breeding—is not likely to secure universal adhesion, though it is the etiquette of the British Association not to criticise the presidential address.

BEDROCK.

In No. 1 of Vol. 3 of *Bedrock* (London, Constable & Co., 2s. 6d. net), there are a number of valuable papers of interest to our readers, among which we notice 'The Significance of the Discovery at Piltdown'; 'Coral Snakes and Mimicry'; 'The Evolution of Mimetic Resemblance'; 'Mechanism v. Vitalism—Verdict and Judgment'; 'Directions of Recent Work on the Inheritance of Acquired Characters'; 'The Milk Problem'; and 'The Instruction of School Children in Matters of Sex.' This publication is one of very great interest, and we would strongly recommend readers of *The Naturalist* to see it.

THE MAY LILY.

Knowledge for August contains two very fine illustrations of the May Lily, evidently from the Yorkshire locality. In view of the extreme rarity of this plant, and in view of the fact that Mr. Horwood of the Leicester Museum professes to take such a great interest in the preservation of our wild flowers, it is somewhat surprising, and a little annoying, to find that he goes to such trouble to give the exact locality for this beautiful and rare flower. We trust that should any of the readers of the article be successful in finding new localities for this plant, they will not follow Mr. Horwood's example, but keep the information quiet.

FURTHER PILTDOWN FINDS.

We learn from *The Antiquary* that 'Among the Piltdown specimens exhibited by Mr. Charles Dawson at the Royal Society conversazione on June 16th was a large bone implement discovered on the previous Saturday in excavations by him and Dr. Smith Woodward of the British Museum. The implement is fashioned from a thigh-bone of a fossil elephant, and measures 16 inches long by 4 inches wide and 1¾ inches thick, and is roughly trimmed at both ends. One end—presumably the "Business end"—is cut to a point like a stake; the other end is roughly rounded for the hand. It is quite mineralized and stained with iron. It is the largest and probably the earliest bone implement yet discovered, and may be the work of the primitive human form called *Eoanthropus dawsoni*. Part of a tooth of an early rhinoceros has lately been discovered in the gravel. The excavators look forward to a promising season.'

THE FRENCH ASSOCIATION.

The Forty-third Congress of the French Association for the Advancement of Science was held at Le Havre from July 27th to August 2nd, and to this the members of the British Association not in Australia were invited, and a meeting of the delegates of the Corresponding Societies of the British Association was also held during the Congress. The President of the Yorkshire Naturalists' Union was invited to be the guest of the Corporation of Havre, and with a few others was entertained at the Hotel Frascati. The French Association, however, enthusiastic though the members were, and of course, proverbially polite and attentive, seems to fall a long way behind the British Association in its methods and arrangements. For one thing the attendance was comparatively poor, and the enormous number of sections into which the French Association is divided made many of the meetings appear to be sparsely represented. The excursions were very pleasant, but the declaration of war rather abruptly terminated the proceedings, and curtailed the long excursions, and the English delegates had to return home as quickly as possible, with varying excitements and experiences. The delegate of the Yorkshire Naturalists' Union shared these, but eventually reached home with his luggage, and a very little cash, which is more than some did.

DYTISCUS MARGINALIS.

In *Knowledge* for June is a very fully illustrated account of the Water Beetle (*Dytiscus marginalis*) by W. H. S. Cheavin. The life history is described and structural details of both larva and adults are illustrated by a series of photo-micrographs. These depict the head and mouth-organs, tracheae and spiracles of the larva, and the main nerve ganglion, eye-

facets, spiracles, etc., of the perfect insect. One of the most interesting of the photographs is that of a posterior spiracle. The spiracles or breathing-pores of *Dytiscus* occur as oval apertures on the sides of each abdominal segment. Projecting across the opening are a series of structures covered with fine hairs, which serve as dust-catchers, and allow only clean air to enter the breathing tubes or tracheae. The last pair of spiracles, situated near the tail-end of the abdomen, are unusually large.

METHODS OF BREATHING.

When the Water-Beetle rises to the surface for air it projects the tip of its abdomen above the surface film and at the same time opens its wing-cases very slightly. Air is taken by the abdominal spiracles, especially by the last pair, and a supply is also gathered under the wing-cases, where it is held by the hairs on the back of the abdomen, and forms a large air-bubble. The insect then plunges beneath the surface, the air under the wing-cases being passed forward to the front spiracles, and thus the beetle, in a state of enforced submergence, can remain under water for a considerable period.

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The Report and Proceedings of the Manchester Field Naturalists and Archaeological Society has just appeared and contains a detailed account of the Society's excursions, from different pens, and a number of illustrations, including one of the President, Sir William H. Bailey, who died recently.

The **Transactions of the Cumberland and Westmorland Antiquarian and Archæological Society,** Volume XIV., recently issued, contain among many other papers the following items of particular interest to our readers :—On ' The Discovery of a Bloomery at Lindale Church near Grange-over-Sands,' by J. W. Jackson ; ' Neolithic Implements in Furness' by J. Dobson ; ' A Submerged Church in the River Eden,' by the Rev. C. J. Gordon ; ' The Caves known as Isis Parlis,' by the Rev. A. J. Heelis ; ' Report on the Exploration of the Roman Fort at Ambleside,' by Profs. Haverfield and R. G. Collingwood ; and ' Some Birkrigg Barrows,' by the Rev. Charles Gelderd, J. Randall and J. Dobson.

The Annual Report of the Scarborough Philosophical and Archaeological Society includes that of the Naturalists' Society. During the year £160 was paid on improving the Museum, towards which £63 in subscriptions are acknowledged. As a frontispiece to the report is a photograph of the society's specimen of the Giant Tortoise from the Galapagos Islands which was lent to the Hon. Walter Rothschild for the purpose of making a plaster cast. He reports that it is the only existing specimen of the long extinct Barrington Island Tortoise. We notice that on the frontispiece the specimen was presented to the Society in 1840 by John Wharton, whereas, on page 11 of the report a precisely similar specimen appears as the gift of the Hon. Walter Rothschild, presumably the Society now has two giant tortoises, one an extinct species, and one not extinct, but it is not very clear.

Naturalist,

THE EARLY HISTORY OF FILEY.*

T. SHEPPARD, F.G.S.

FILEY, the sea-side resort, the Filey as we know it to-day, may be said to date from the discovery of a 'Spa well' of undoubted nastiness but doubtful quality, just about the time when medicinal waters became a craze throughout the land. That was a century or so ago, when nearly all the ills that flesh was heir to were cured by drinking evil-smelling and vile-looking liquids, known as spa-waters. Probably the patients felt that this was a more welcome cure than the previously popular 'bleeding,' and hence its charm.

Harrogate and Scarborough, about the same time, made a bid for popularity on the strength (sic) of their spa-waters, and we find quite an extensive literature dealing with these various springs and their healing properties.

Of course there was a Filey before the Spa—there are still old houses which prove that. The church also takes us even earlier. But to begin at the beginning we should have to go further back by several hundred years.

It so happens that in the immediate vicinity of Filey there is evidence of the almost continuous occupation of the area for certainly far more than two thousand years.

Of the Palæolithic or old-stone-age men, there are, of course, no relics in this area, notwithstanding recent reports to the contrary. But of the new-stone or Neolithic age there are quite a large number of evidences. The hills around the township are strewn with neolithic weapons. The dark-flints which are contained in the drift beds provided the material for the axes and spears and arrows and scrapers; the flint in the Flamborough chalk being too brittle and unsuitable. Within a very small area in a single field at Reighton, Mr. C. G. Danford and I obtained nearly three hundred flakes, a few years ago. Only a few miles to the south I have recorded neolithic workshops on a large scale.†

In addition to these, some beautifully wrought hammer-stones and axes, often perforated, are recorded from the district, Speeton and Hunmanby especially having produced quite a large series.

A little later in date are the barrows or burial mounds of the Bronze-age, which have been opened at various points in the district. That at Gristhorpe, now in the Scarborough museum, is perhaps the best known. In that case the bones of the skeleton, together with a bronze dagger, etc., were found in a coffin made from a hollowed trunk of an oak tree, a few though

* Read at the Filey meeting of the Yorkshire Naturalists' Union.

† See *The Naturalist*, 1910, pp. 293-298.

not quite so perfect examples of which are recorded in other areas. At Reighton, many years ago, I watched Canon Greenwell open some tumuli, though a large jet bead—of the Bronze age—was the only relic found. More recently Mr. Danford and I opened two others, but we obtained little beyond a large quantity of flint flakes.

From Hunmanby and other villages round about, the Hull Museum contains some fine bronze-axes which have been turned up by the plough, and other relics of that period are known.

There are earthworks, too, belonging to this period, or possibly a little earlier, but they do not appear to have been so well investigated here as they have been further south on the Wolds.

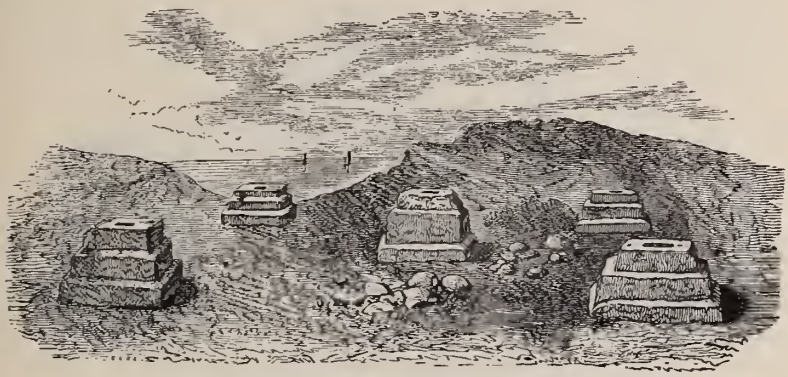
Objects relating to the Early Iron Age are comparatively rare, anywhere; but close to Filey, at Hunmanby, I had the pleasure a few years ago of excavating a chariot burial of this period. This was a particularly lucky find, as among the seven-hundred East Yorkshire burial mounds examined by Canon Greenwell and the late J. R. Mortimer, they only found about half-a-dozen containing remains of chariots.

The grave I opened was on the side of Mr. Parker's brick-pit at Hunmanby. It was quite a small burial, and all trace of a mound had disappeared. Among the relics found were the chariot wheels, in an upright position, the bronze bridle-bit and other horse trappings, traces of a shield, and remains of a horse. The date of the burial was of the second or first century, B.C.

The early geographer, Ptolemy, records that there was in his time in this district a tribe of the Parisi, presumably a branch of the Parisii on the Seine, who left their name in the city of Paris. The ancient tribe of the Brigantes also occupied East Yorkshire in pre-Roman times, but which was in occupation first, or whether both lived in the area as 'neighbours,' is not known. It is known however, that in these small Iron Age tumuli in East Yorkshire, and in these alone, chariot remains and horse trappings occur buried with the dead. Of these chariots, and the havoc they wrought, there is abundant evidence in the early Roman records. And it is of some moment to bear in mind that this district—the land of the Parisi and the Brigantes—has yielded such positive proof of the former existence of this early method of warfare.

The next milestone in our history is that of the Roman occupation. Filey was certainly visited in Roman times, but only, I think, to a small extent. I have not been able to find any evidence that it was a place of any size or importance; at most it seems to have been a look-out station on the coast, or, possibly, as some have suggested, merely served the purpose of a lighthouse.

The earliest paper I have been able to trace on this subject was read to the Society of Antiquaries, London, on May 17th, 1832, by 'John Walker, Esq., of Malton.' It is entitled, 'Observations to prove Filey Bay, in Yorkshire, the Portus Felix or Sinus Salutaris; and Flamborough Head, the Ocellum Promontorium of the Romans.' The author begins by stating that, 'In the year 1821 a *respectable gentleman* (!), Thomas Thompson, Esq., of Cottingham Castle, published 'Ocellum Promontorium' in which he opined that Spurn was the promontory Ocellum.' John Walker, Esq., then proceeds to show that the respectable gentleman, Thomas Thompson, Esq., was all wrong, and various latin quotations and derivations, measurements of longitude and latitude are given to show that Walker was right. But the paper does not appear to



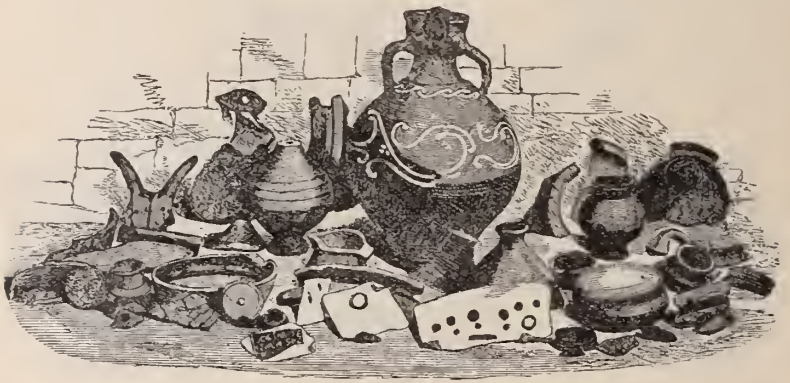
Squared Stones from the Roman site at Filey.
(*After Cortis*).

contain a single sentence which contains any real evidence of Roman occupation at Filey.

In 1858, however, we have perhaps the most important paper on the subject. It is entitled, 'Remarks on the Discovery of Roman and British Remains at Filey, Yorkshire, in October, 1857, with some observations on the position of Portus Felix and Prætorium, by W. S. Cortis, M.D. . . . . Scarborough, 1858.' We will leave the 'observations on the Portus Felix' and deal with the discoveries. They were made on the top of Carr Naze, as the result of a landslip. The foundations of two walls were found, 22 feet apart; towards the middle were five squared stones, evidently supports for the bases of props or pillars, and by their side were the foundations of apparently a small room. The squared stones were about 20 inches high and four were placed at equal distances apart;

the fifth one big in the centre. On the last is shown a representation of a dog chasing a stag, and said to have been 'very well carved.' These stones were removed to the Crescent Gardens, where they now are. They are yet in very good condition, and on the centre one can certainly be seen the carved representation of two animals, notwithstanding the weathering they have been subjected to while being 'preserved' in the gardens.

In his memoir, Dr. Cortis gives an illustration of 'British and Roman remains found at Filey,' which shows a remarkable collection of objects. True, he does not specifically state that they were all found at Carr Naze, but evidently most of them were. The centre vase, decorated with slip, is very like late



Roman Pottery, etc., found at Filey.

(*After Cortis*).

Celtic in design. Among the objects enumerated are whole and broken querns or handmills, a fragment of shale inscribed, 'Cæsar se Quam spe,' whatever that may mean. There were over 40 small bronze coins by the later emperors (probably all fourth century); whole and perfect vases, copper rings and buckles, pins, arrow and spear head of iron, an object said to be the point of a sword, a sharpening hone, pieces of glass, a large bead, etc. There were bones of pigs, oxen, sheep, deer, goats and fowls, including legs of several game cocks. Oysters and muscle (*sic*) shells and limpets were found in abundance, and there were traces of fire. In the surface soil was obtained a British stone axe.

It would be interesting to know where these relics now are; the production of the inscribed piece of shale would be

especially welcome. As Dr. Cortis was a Scarborough man possibly they may be there.*

In the second part of his paper Dr. Cortis runs off along the philological tack, where we must leave him. He doubts not that the present Filey is the Portus Felix; the name alone being almost sufficient to identify the two. He admits, however, that most of his proof is of a negative character.

The finds, interesting as they are, hardly seem to warrant a conclusion that Filey was a place of great importance in Roman times. There was doubtless a coast station if not an actual lighthouse; but beyond that I fear we should be scarcely justified in assuming. By some writers the 'Spittal' or 'The Spittal Rocks' are considered to be evidence of a Roman quay or pier; an old name is said to be 'Old Quay Rocks.' The Spittal is a distinct ridge, about 200 yards from Filey Brig, and runs at right angles to the Brig. It has been reported that there are distinctly hewn stones used in its construction. On this point we should much like to have some definite information.

In Danish times the area around Filey was occupied, as shown by such place names as Hunmanby, Carnaby, Gristhorpe and Weaverthorpe; while Speeton, Reighton, Buckton and Bempton seem to indicate Saxon settlements. But with the exception of a few remains in the Churches, etc., relics of these early people are rare in the district.

William the Norman, who was a model Chancellor of the Exchequer, gives evidence of a village at Filey in the 11th century. According to Domesday Book, the place was then known as Fiuelac, that is Fivelac. In the thirteenth century (Kirkby's Inquest) it was Fyvele and Fyveley. The old derivation of Five lac = five lakes, will not hold water, Mr. W. H. Stevenson tells us in his paper on 'The Place-name Filey;' † Mr. Stevenson thinks it may be derived from fifel-leh, that is fifel, a monster or giant, and læh—woodland; therefore in the early days Filey was a place haunted by demons or evil spirits. And that was before it was visited by naturalists and antiquaries.

The Domesday record is very brief and merely refers to the fact that Fiuelac was within the manor of Walsgrave (Scarborough).

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* A recent visit shows that they are not in the museum at Scarborough. Since the paper was read, Mr. Oxley Grabham informs me that there is a large face amphora, with the body decorated with slip, found at Carr Naze in 1857, in the York Museum. This seems to be that shown in Dr. Cortis's illustration. Possibly the other objects are also at York.

† Trans. East Riding Antiq. Soc., Vol. XIV., 1907.

NAIAS FLEXILIS, ROST. & SCHMIDT; A NEW RECORD FOR ENGLAND.

ARTHUR BENNETT,
Croydon.

In July Mr. W. H. Pearsall of Dalton-in-Furness sent me specimens of the above species which is a new record for England; though Scotland and Ireland are well-known to produce it. He found it in Estwaite Water near Hawkshead, and associated with or near it were *Callitriche autumnalis* L. and *Potamogeton pusillus* L. In the same water he gathered *Elodea, Potamogeton perfoliatus, P. crispus, P. alpinus* and *P. obtusifolius.* The plant was coming into fruit, though these were young. Mr. Pearsall has made a suggestion which seems worthy of acceptation, i.e., that Lake Lancashire should be in records named as 69b, Westmorland as 69a. The county is so adapted for a Flora by itself, and as we are led to expect a Flora for the whole county of Lancashire, it seems it is worth consideration as a means of defining the records.

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ADDITIONS TO THE FAUNA OF THE UPPER CHALK, FLAMBOROUGH.

GEORGE SHEPPARD, F.G.S.

During a recent series of visits to the coast section between the South Sea Landing and High Stacks (zone of *Micraster cor-anguinum*) I collected a number of smaller fossil types principally from the weathered surfaces and ledges of the chalk.

Owing to the exceptional hardness of the chalk at this horizon, the fossils weather out in a conspicuous manner, and are usually in a fair state of preservation.

It is interesting to note that, according to the authorities at the British Museum, four of the specimens are new records for the Yorkshire Chalk, namely:

Pycinaster angustatus (?) Forbes.
Spondylus spinosus.
Enchodus (Tooth).
Pholadomya sp.

Along with other specimens from the same horizon, the above have been placed in the geological department of the Hull Museum.

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In *The Zoologist* for August Prof. Mackintosh gives some general remarks on some points in the life-history of the salmon; and there is also Professor W. Bateman's address delivered before the British Association Meeting in Australia.

YORKSHIRE NATURALISTS AT ASKRIGG.

ORIGINALLY fixed for Bainbridge, headquarters for the excursion had perforce to be at Askrigg, as sufficient accommodation could not be obtained at the former place. It is unfortunate that a more adequate railway service is not available to this delightful part of Upper Wensleydale, for the

Photo by] [*the Misses Campbell.*

Mill Gill, Askrigg.

facilities offered to the workers in various sections are such that a much larger attendance would doubtless have resulted for the Saturday's excursion. It was owing to the deficient railway service, and possibly in part to the inability to properly estimate their walking abilities, that a small party from the West Riding

had to foot it from Hawes Junction to Askrigg, happily arriving in time for tea and meeting.

Saturday was devoted to an investigation of the ravines locally known as Mill Gill, Whitfield Gill, and Skell Gill. Mill Gill was of especial interest to the geologists, as here were seen the sections by which Phillips, eighty years ago, measured and classified the Yoredale series of rocks. The botanical features of the route also amply repaid investigation.

At the close of the excursion the usual meeting was held, the President (Mr. Thomas Sheppard) occupying the chair, when the various reports were given. Mr. W. Horne, in remarking upon the geological features noted during the day, referred to his acquaintance with Phillips, and exhibited a photograph of this famous Yorkshire Geologist. Hearty thanks were accorded to the divisional Secretary, Mr. W. Robinson, for his services in making the local arrangements, and also to Messrs. W. Horne, Mr. J. Hartshorn, and Mr. J. J. G. Lodge for their services as guides.

The majority of the party stayed overnight, and spent Sunday in the vicinity of Lake Semmerwater.—W. E. L. W.

Mr. Sheppard writes that Sunday proved a delightful day, and the members were greatly indebted to Mr. Lodge for the treat he gave them in the way of urging them on over many very tiring miles, and also for the fund of local information which he imparted. The members first walked to Bainbridge, where, on a hill top above the village, was a Roman camp in remarkably perfect preservation. The square camp, with its ramparts and ditches—and an entrance in the centre of each earthwork, was practically untouched either by the hands of time or man. On the hill opposite—over the river bed, were certainly clearly defined circular earthworks, which Mr. Lodge considered to be of earlier, *i.e.*, British date. On the way to Semmerwater the members visited the charming waterfall known as Mill Gill, where the even bedding of the Carboniferous rocks was very marked. Semmerwater itself is of geological interest, as it obviously owes its existence to a dam of morainic material left during the Great Ice Age. The walk round the mere was delightful. On its margin were interesting wild flowers in great variety, and there was evidence that various waterfowl and other birds nested in or near it; while in the water could be seen the shells of the Swan mussel, and numerous crayfish of large size. The place was a veritable naturalist's paradise.

On the previous day the members had examined the various charming gills already referred to. These, with their regularly bedded rocks, and here and there the waterfalls of no mean size and of great beauty, proved a most welcome retreat and shelter from the heat. There was not too much water, which made

the ramble the more enjoyable. Being on the original ground so well worked by Yorkshire's pioneer geologist, Phillips, the party felt that it had an additional interest. The flat beds of limestone and shale exposed in the beds appeared in places with step-like regularity, and gave ample opportunity for collecting the large *Producti* (from the 'Cockle beds'), corals, encrinites, and other typical fossils. In some places these scars were traversed with deep joints with such unfailing regularity that, viewed from the slopes above, they might very readily be mistaken for pavements fashioned by man. At one point a thin seam of coal was pointed out, and though this was not of the purest, and would certainly contain a fair amount of 'ash,' yet it served the local villagers to tide over the recent coal strike. This coal measure is of interest as being probably one of the lowest and therefore one of the oldest in the British Isles. The party also had an opportunity of examining the sections exposed during the construction of a small reservoir.

While crossing over from one gill to another the members saw the various morainic and other glacial features which occur in the area, and it was apparent that the great Ice Age had played a not unimportant part in the configuration of the land in this district.

It was refreshing to find, on the banks of the stream, near Askrigg, a quite flourishing little factory for making hay-rakes. This was driven by power derived from the stream, and the extent of the works was a surprise. It was also unexpected to learn to what an extent electricity is used both for motor power and for lighting. I shall not soon forget the shock I received on going into an old tumble-down cow-shed, in the hope of finding a stray 'by-gone,' to observe an electric switch on the wall, a turn of which filled the place with electric light.

Being so near Leyburn the present writer could not resist the kind invitation to visit Mr. Horne's well-known museum of local antiquities, etc., in which are shown the fine collection of fossil fish teeth from the Carboniferous rocks, of which Mr. Horne is so justly proud. He will also long remember the walk along that marvellous natural terrace, the 'Shawl,' upon which, some time ago, Mr. Horne found some interesting prehistoric remains. Nor can he refrain from mentioning the grand game of golf which he had with the veteran antiquary and the schoolmaster, over a most 'tricky' course, and with so close a finish!

COLEOPTERA.—Mr. M. L. Thompson reports that in wet moss, near the waterfalls in Whitfield Gill, were found :—

Myllæna brevicornis Matt.	*Lesteva pubescens* Man.
Quedius auricomus Kies.	*Lesteva punctata* Er.
Stenus guynemeri Duv.	(*muscorum* Duv.)

In moss on the slope of the ravine were the following :—

Ocyusa incrassata Muls.
Homalota analis Grav.
Sipalia ruficollis Er.
Tachyporus chrysomelinus L.
Choleva morio F.
Bythinus puncticollis Den.

The other beetles met with along the route to and from Mill Gill and Askrigg were :—

Notiophilus biguttatus F.
Nebria gyllenhali Sch.
Pterostichus madidus F.
Anchomenus albipes F.
Patrobus excavatus, Pk.
Creophilus maxillosus L.
Anthobium minutum F.
Anthobium torquatum Marsh.
Adalia obliterata L.
Coccinella 10-*punctata* L.
Brachypterus urticæ F.
Malthodes marginatus Lat.
Malthodes minimus L.
Phyllodecta vitellinæ L.
Hydrothassa marginella L.
Crepidodera transversa M.
Apion dichroum Bed.
Apion humile Germ.
Otiorhynchus picipes F.
Strophosomus coryli F.
Sciaphilus muricatus F.
Polydrusus pterygomalis Sch.
Athous hæmorrhoidalis F.
Dolopius marginatus L.
Corymbites quercus Gyll.
Dascillus cervinus L.
Podabrus alpinus Pk.
Telephorus pellucidus F.
Telephorus hæmorrhoidalis F.
Telephorus paludosus Fall.
Rhagonycha limbata Th.
Rhagonycha pallida F.
Phyllobius calcaratus F.
Phyllobius urticæ De G.
Phyllobius argentatus L.
Phyllobius viridicæris Laich.
Phyllobius viridicollis F.
Liosoma ovatulum Clair.
Orchestes fagi L.
Cæliodes quadrimacutatus L.
Ceuthorhynchidius troglodytes F.

Four beetles obtained by Mr. Rosse Butterfield on the slope of Addeborough, were :—

Anchomenus dorsalis Mull.
Pterostichus diligens Stm.
Anacæna globulus Pk.
Gastroidea polygoni L.

The most notable capture of the day was undoubtedly the single specimen of *Ocyusa incrassata*, No member of this genus appears to have been previously recorded for Yorkshire.

Botany.—Mr. J. Hartshorn writes :—Most of the species expected were found in the ascent to Whitfield Gill. Of greatest interest were Wood Stitchwort (*Stellaria nemorum*), Melancholy Thistle (*Cnicus heterophyllus*), Mountain Speedwell (*Veronica montana*), and the Marsh Crepis (*Crepis paludosa*). Of ferns the gills still yield the Bladder, Oak, Beech, and Harts-tongue ferns. Near Whitfield and also about Semmerwater, the Alpine Bistort (*Polygonum viviparum*) grows abundantly. The bog bean, so striking when the Union last visited the lake, was mostly in the fruiting stage, but the Yellow Water-lily (*Nymphæa lutea*) was seen in bloom in the Bain.

Members walking down the valley from Hawes Junction noticed the prevalence of the Wood Geranium and the com-

parative absence of the Meadow Crane's-bill. The distribution of these species in the Dale may be noted. *Geranium sylvaticum*, which blooms rather earlier, is the common one in the upper parts, and *G. pratense* in the lower. Incidentally. Wensleydale is rich in its number of British Geraniums, as of species of Speedwell, but *G. sanguineum* is not one of them.

In order to complete the meeting, Ellerbeck was visited during the week following. A diligent search for the Alpine penny-cress (*Thlaspi occitanum*) did not reveal a single specimen, a somewhat remarkable experience, as Babington, in his flora, gives as the period for *Thlaspi alpestre*, June to August. Indeed this year there were blooms on March 7th, and similar dates have been established for the last seven or eight years. Scurvy grass likewise had mostly run its course, as was the case with *Primula farinosa*, but the Thrift (*Armeria maritima*)—in what might be described as a unique situation —and *Arenaria verna* were generally distributed and in fine condition. Though not conspicuous, Moonwort (*Botrychium Lunaria*) and *Selaginella Selaginoides* were fairly common.

Other species noted by members during week-end as having something of interest were :—

Viola lutea var. *amoena*, *Geranium lucidum*, *Potentilla verna*, *Myrrhis odorata*, *Peucedanum Ostruthium*, *Carum carvi*, (at Marsett). *Saxifraga tridactylites*, *Sax. hypnoides*, *Parnassia palustris* (in bud). *Galium Mollugo*, *G. erectum*, *Pinguicula vulgaris*, *Rumex domesticus*, *Orchis latifolia*, *Habenaria albida* and *Habenaria conopsea* Benth = *Gymnadenia conopsea* Br.

Mosses and Hepatics.—Mr. W. Ingham writes :—On Addlebrough a mass of the golden-yellow moss *Hypnum chrysophyllum* var. *erectum* Bagnall was found, also, in a hole, a very filiform form of *Eurhynchium Swartzii* was noted by Mr. Bellerby.

By Semmerwater was abundance of *Hypnum vernicosum*, the typical plant, associated with the mosses *Hypnum giganteum*, *Fontinalis antipyretica*, *Bryum bimum*, and *Mnium affine* var. *elatum*.

At Park Scarr were the mosses *Swartzia montana*, *Trichostomum crispulum*, typical, and *Hypnum vernicosum* with the hepatics *Cephalozia bicuspidata*, a very small form, and a large form of *Lophozia ventricosa*.

At Mill Gill, in addition to common mosses, was the rare species *Trichostomum crispulum* var. *elatum* growing in crevices of rock close by the fall.

In Whitfield Gill the dominant mosses were *Brachythecium plumosum*, *Porotrichum alopecurum*, *Hypnum uncinatum* and *H. molluscum*.

On vertical cliffs on the left side facing the fall were many

small adherent patches of the minute *Seligeria pusilla*, and the hepatic *Haplozia riparia*, whereas on the vertical cliffs on the right were many pale patches of the hepatic *Cololejeunea calcarea*, also closely adherent to the rock face at right angles to the stream.

Preissia quadrata, a thalloid hepatic, was in good fruit by the stream, as well as *Metzgeria pubescens*. For further information about the bryophytes of this district see *The Naturalist for* 1905, page 278.

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The **Annual Report of the Midland Railway Natural History Society**, 24 pp., contains particulars of the work of the various sections, as well as summaries of lectures given during the year. Mr. R. Watkin of the Engineer's Dept., Derby, is the Hon. Secretary.

The Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Vol. 58, Part II., contains a number of papers, among which we notice, 'How does the Plant obtain its nutriment from the Soil,' by A. D. Hall; and the 'Faunal Survey of Rostherne Mere,' by Messrs. W. M. Tattersall, and T. A. Coward.

The Proceedings of the Holmesdale Natural History Club for the years 1910-13, published at the Reigate Press, 1914 (100 pp., 2s. 6d.) include abstracts of papers, etc., only a few of which, however, bear directly upon the club's district. Among the items we notice a visit to Crete; Eggs of Moths; Brazilian Tour; Extinct Animals, etc., and Mr. C. E. Salmon gives Surrey Plant Records.

We have received the **Report of the Botanical Exchange Club**, edited by the secretary, Mr. G. Claridge Druce (Vol. III, Part V., pp. 307-440, 5s.) It is a remarkable record of the club's work during 1914, and contains botanical notes dealing with most parts of the country. In addition to these there are plates illustrating *Lepidium Pseudo-didmum* Thellung, *Amaranthus thunbergii* Moquin, *Nassella flaccidula* Hackel, and *Hordeum violaceum* Boissier.

Vol. IV, Part I. of the **Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne** contains a remarkable record of the work done by this enthusiastic institution. In addition to the reports of the society's work, we notice two papers on 'British Symphyla,' by Mr. R. S. Bagnall; who also describes a new species of Brachypauropus. The Rev. J. E. Hull illustrates 'New and Rare British Spiders'; 'British Spiders of the genus Microneta' are described by Mr. A. Randall Jackson. Dr. Verhoeff writes on 'The Occurrence of Brachychaeteuma, Titanosoma and Polymicrodon in England,' and Mr. G. Stewardson Brady gives 'An Amended Description of Diaptomus Sancti Patricii'; Mr. C. T. Trechmann gives notes on 'Neolithic Chipping Sites in Northumberland and Durham'; Mr. R. G. A. Bullerwell describes 'A Section of the Cliffs near Newbiggin-by-the-Sea,' and Dr. J. A. Smythe 'The Glacial Geology of Northumberland.' Reports of the field meetings are given by Mr. C. E. Robson and Mr. B. Amsden. We should be inclined to differ from Mr. Trechmann who states that the flint on the neolithic sites in Northumberland and Durham 'almost certainly come from Yorkshire Wolds, as it greatly resembles that composing the implements left in such quantity by Neolithic man in that district.' As a matter of fact the flint implements on the Wolds are not made from Yorkshire flint, but from glacially borne flints in the Holderness drifts. (See *The Naturalist*, 1910, pp. 293-298).

BRITISH ORIBATIDÆ:
NOTES ON NEW AND CRITICAL SPECIES.

Rev. J. E. HULL.

(*Continued from page 250*).

There are other minor discrepancies, especially in the sculpture of the cephalothorax, but these are characters not quite so definitely expressed by Michael.

The *S. maculatus* of Oudemans and others (from the coast of Holland and Sweden) is, I think, undoubtedly identical with *pseudomaculatus*. So also is Trägårdh's single specimen from Greenland, which he called *S. maculatus* var. *groenlandica*. It is, I suppose, a young imago incompletely pigmented. In some of my collections quite a half of the specimens are in this state.

Insularis is without doubt a variety (aberration would be a better term!) of *pseudomaculatus*. At first sight I took it to be simply a case of retention of the cast nymphal dorsum, so similar is the sculpture of the dorsum to that of the nymph, and could hardly believe it was otherwise till I had actually removed it from two or three specimens. The resemblance in outline is as close as the resemblance in sculpture: in each case it stops short of identity. It will suffice to say that the dorsum is oblong, rounded behind, strongly wrinkled transversely, raised a little in the middle and at the sides; not very strongly chitinized in any of the examples I possess. Marginal spines equal, or nearly so, of the same character precisely as those of the type form.

The typical form swarms on lichen growing on walls and rocks near the sea in the neighbourhood of Whitley Bay, Northumberland. Mr. Bagnall also took it on the same yellow lichen on walls on Muggleswick Common, Durham, at an altitude of about 1,600 feet. *Insularis* I first found on St. Mary's Island, on rocks occasionally covered by the tide. It was living in company with *S. bilineatus*, but only in very small number among myriads of the latter. It occurred again with the type form on the mainland nearly opposite, on lichen in a cliff wall.

S. SCULPTUS Mich.

S. LINEATUS Thor. (—*corrugatus* Mich.).

Both of these species are abundant in the neighbourhood of Tynemouth, the latter in fresh-water pools, the former in ground moss; and *S. sculptus* has been taken also far inland among the hills, near Wooler (Mr. Bagnall), and Middleton-in-Teesdale (Mr. J. W. H. Harrison).

1914 Sept. 1.

CARABODES Koch.

C. MARGINATUS Mich. (Plate C, fig. 11).
C. NEPOS sp. n. (Plate C, figs. 2, 10).
C. SCYMNUS sp. n. (Plate C, figs. 1, 12).
C. FEMORALIS Nic.
C. CORIACEUS Koch.

This is another group of several members so closely allied as to suggest variation within the limits of a species; or, as some systematists prefer, *two* species, with a series of intermediates. Personally, I do not hesitate to say that there are here either five species, or one only; and as I entirely agree with Trägårdh that distinct forms are less likely to drop out of sight if recorded under definite names, I give the same rank to all the five. For I do not know a single reason except priority of record, for setting one form above the rest as the stem or type. To make it quite clear in what sense the specific names are here used, I append an 'artificial' key of the British species of *Carabodes* in which the dorsum of the abdomen is marginate.

1.	Disk of the dorsum uniformly granulate ..	2.
	Do. do. furrowed, not granulate ..	4.
2.	Pseudostigmatic organ pointed at the end ..	marginatus.
	Do. do. bluntly clubbed ..	3.
3.	All the dorsal hairs thick and white	nepos.
	Marginal hairs neither thick nor white ..	scymnus.
4.	Dorsal hairs thick white conspicuous ..	coriaceus.
	Do. inconspicuous caducous ..	femoralis.

By far the most abundant of these is *scymnus* (any remarks as to relative abundance within my own experience are to be understood of the counties of Northumberland and Durham). Next, but a long way behind, are *femoralis*, *nepos* and *marginatus*, in the order named, but fairly nearly equal. Last of all is *coriaceus* of which I have seen one example only (and that occurred casually in a tuft of moss sent to me for identification, from Durham County). I give some further details of *scymnus* and *nepos*.

C. SCYMNUS sp. n. (Plate C., figs. 1, 12).

Length from 450 to 500 μ.

Uniformly black, except the lamellæ which are often brownish, and the legs, which are of the normal yellow brown colour.

Abdomen broadish oblong rounded behind, very nearly straight in front but sloping a little towards the obtuse shoulders; the whole integument above and below strongly wrinkled so as to appear granulate. There is a distinct lateral and posterior border, of the same texture as the dorsum, broad and sloping at the shoulders, then narrower and nearly vertical, widening again behind. About midway it bears a

short stiff dark hair, and three more on each side behind, equidistant; none on the anterior part. Hairs of the disk similar to those of *marginatus*.

Lamellæ nearly horizontal, broadest in front, though the actual extremity is narrowed a little. Cusp blunt, front margin slightly concave. Towards the extremity a rough seta springs from below the outer rim and curves round in front, nearly in contact the whole way. The vertex rises into a low rounded ridge in the middle which is continued to the rostrum. Pseudostigma prominent, placed well forward; pseudostigmatic organs short and heavily clubbed, reflexed;

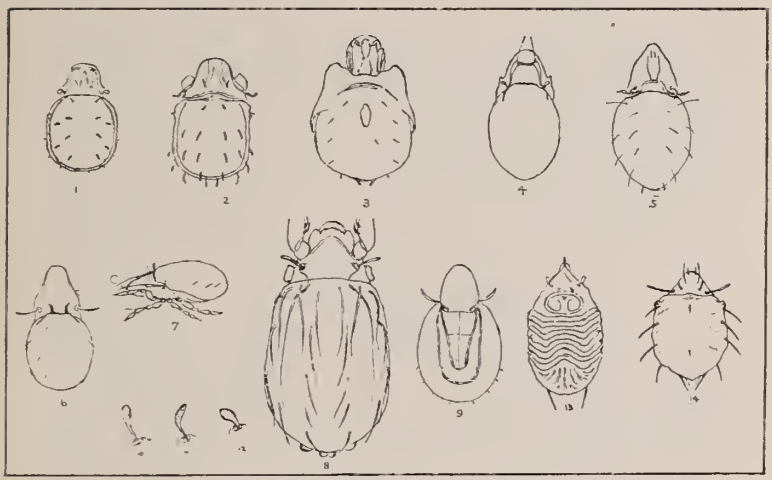

PLATE C.

1. *Carabodes scymnus* sp. n.
2. *Carabodes nepos* sp. n.
3. *Peloptulus montanus* sp. n.
4. *Damæosoma jugorum* sp. n.
5. *Damæosoma lanceolatum* var. nov. *lunare*.
6. *Damæosoma vitrinum* sp. n.
7. *Oribatula affinis* sp. n.
8. *Hermannia fluviatilis* Hull.
9. *Hoploderma affine* sp. n. (under side).
10. *Carabodes nepos*, pseudostigmatic organ.
11. *Carabodes marginatus* Mich., pseudostigmatic organ.
12. *Carabodes scymnus*, pseudostigmatic organ.
13. *Peloptulus montanus*, nymph (putative!).
14. *Oribates* sp., nymph.

the head is roughened, and often, though not always, bears a few sharp points at the extremity. Interlamellar setæ thick white, in a line with the pseudostigmata, set in the furrow between the lamella and the median ridge.

From many localities in Northumberland, Durham, and

Yorkshire ; abundant in lichen and dead wood. Oudemans records it for Holland under the name of *marginatus* Mich.

C. NEPOS sp. n. (Plate C, figs. 2, 10).

Length about 700 μ.

Texture similar that to of *scymnus* and *marginatus*, but the granulations are slightly coarser and more apt to run into lines.

Cephalothorax with distinct median ridge, divided by furrows from the lamellæ. At the posterior end of the furrows stand the thick white lamellar hairs. Behind is a transverse ridge bowed forward in the middle and reaching from one pseudostigma to the other. Between this ridge and the abdomen is a deep transverse furrow. Pseudostigmatic organs almost uniformly cylindrical, doubly curved.

Dorsum with the outline of *coriaceus* and the surface of *marginatus*. It agrees with both in the chaetotaxy of the disk, and differs from both in the postero-marginal hairs which are exactly like those of the disk. On each of the projecting shoulders there is a curved rigid sharp spine, and a small smooth boss in the middle of the fore margin.

Fairly frequent in West Allendale, Northumberland, and in the Derwent Valley, Durham ; usually on dead wood.

ORIBATULA Berlese.

I am following the order of Michael ; otherwise this genus would have appeared next to *Oribates* of which it is practically a section with pteromorphæ rudimentary (or, exceptionally, entirely absent). Indeed, I think the true place of Michael's *Oribates lucasii* (non *O. lucasii* Nic., which is larger, with blunt-ended pseudostigmatic organs), is here ; for its pteromorphæ are very small, and I have several specimens in which they are totally wanting. I propose the name of *Oribatula michaelii* for this nameless species.

O. AFFINIS sp. n. (Plate C, fig. 7).

Length about 450 μ.

A small pale species near akin to *O. exilis*.

Lamellæ somewhat similar to those of *exilis*, but not extended at the base in front as in that species, and the lamellar seta springs from the acute cusp. This seta is serrate, pretty strong, and projects almost horizontally beyond the rostrum which it passes by a third of its whole length. Pseudostigmatic organs recurved by an obtuse elbow near their base ; shaft slender, extremity spatulate obtuse, fusiform in profile. Interlamellar setæ distant from the dorsal margin by about a fourth of the length of the lamellæ, strong and nearly vertical.

Abdomen rather short and rounded behind. The fore margin is nearly straight in the middle, and there is no alar

projection at the shoulders. Lateral margin of the dorsum very little deflexed, so that the wide space between the dorsal and ventral plates is rather conspicuous. Dorsal hairs few, upright.

West Allendale ; a few specimens only from moss. Two or three more from the Derwent Valley, Durham.

O. PLANTIVAGA Berl.

Abundant in lichen on a cliff wall at Whitley Bay, Northumberland.

DAMÆOSOMA Berlese.

D. JUGORUM sp. n. (Plate C, fig. 4).

Length about 400 μ.

Very pale ; dorsum rather ochreous, surface rough. Abdomen longish oval, slightly narrowed behind, glabrous.

Lamellæ upright blades converging forwards, broadest in front. Translamella a vertical blade of uniform height (one third that of the fore margin of the lamellæ). The lamellar cusp is acute and bears a long seta (longer than the lamella itself). Pseudostigmatic organs clavate directed forward.

Legs normal with one tarsal claw.

Ninebanks and Wooler, Northumberland ; Gibside, Durham. In moss and sphagnum, always rare.

D. VITRINUM sp. n. (Plate C, fig. 6).

Length about 320 μ.

Pale and glassy.

Fore margin of abdomen well defined, with a brown rim, straight in the middle, decurrent within the shoulders. Dorsum broad elliptic with two series of weak hairs.

Legs rather long ; claws monodactyle.

Pseudostigmatic organs thickened upwards but acute at the extremity, slightly pectinated on the posterior side. Lamellæ a pair of parallel ridges slightly pigmented, short and close together.

West Allendale, Northumberland ; Derwent Valley, Durham ; In moss, rare.

D. VETULA sp. n. (Plate B, fig. 6).

Length about 310 μ.

This belongs to the *splendens* group in which the pseudostigmatic organs are fusiform-clavate, and there is no prodorsal pigmented rim.

Lamellæ none ; represented by a pair of median ridges, low and rather broad, parallel, unpigmented, about one third the length of the cephalothorax. The fore margin of the dorsum is so shaped in the middle that the pair of thoracic ridges appear to be continued for a short distance on the dorsum.

Dorsal hairs few, weak and fugacious. No lamellar or

interlamellar hairs. Pseudostigmatic organs like those of *splendens* in form and position, but more slender.

The creature is of a very pale straw colour and very active. Some specimens show vague traces of the usual lamellæ curving inwards from the pseudostigmatic. If present at all they are linear and indistinct.

From ground moss, West Allendale; also sent to me by Mr. Bagnall from two or three localities in Durham.

D. LANCEOLATUM Mich., var. nov. *lunare*. (Plate A, fig. 5).

This form differs from the type solely in having the lamellæ continuous, joined together immediately behind the lamellar setæ as by a translamella. This variety is known to Oudemans (New List of Dutch Acari, 1900). He mentions another form in which the lamellæ extend beyond the lamellar setæ and then curve inwards: this I have never seen.

Var. *lunare* occurs, though not frequently, both among the hills and on the coast (Northumberland and Durham).

D. FORMOSUM sp. n. (Plate B, fig. 5).

Length about 320 μ.

Cephalothorax rather broad. The lamellæ are dark ridges with their bases (adjacent to the pseudostigmata) parallel; they then turn abruptly inwards, just in front of the pseudostigmata, and finally are again parallel for a third of their whole length. Their edges are somewhat irregularly sinuous. There is a slight fold of the integument, bowed forwards, immediately in front of their anterior ends, and a similar fold at the base of the rostrum curved in the same sense but pointed in the middle. Between the lamellæ, in a line with the pseudostigmata, is a pair of elevations similar in character to the lamellæ and of very irregular form bearing the interlamellar setæ. The pseudo-stigmatic organs are slender, strongly curved forwards and inwards, with short fusiform heads tipped with a short seta.

Fore margin of dorsum straight in the middle, chitinized and brown, forming a rim which is shortly decurrent on the dorsum on the inner side of the humeral hair (which is rather longer and more conspicuous than usual). Two series of dorsal hairs.

Claws monodactyle.

In moss, Muggleswick Common, Durham (R. S. Bagnall).

D. TRICARINATUM Paoli.

D. FALLAX Paoli.

Both of these species occurred pretty freely in moss and humus sent to me by Mr. Bagnall from Holywell Dene, near Whitley Bay. The former is not infrequent in the upper parts of the Tyne basin in both counties.

HERMANNIA Nic.

H. QUADRISERIATA Banks (—reticulata Thor.—Mich.).

H. SCABRA L. Koch.

I use Banks' name for the former species, since the British examples agree with his descriptions, and do not agree with Thorell's description or with L. Koch's figure of Thorell's *reticulata*. If Trägårdh's emphatic declaration of the identity of *reticulata* Thor. with the British species be correct (I gather that he has not seen British examples, though he rebukes Banks for trusting too much to documentary evidence!), it is necessary to believe what seems utterly incredible—that Koch and Thorell made precisely the same double blunder in ascribing to the species before them six series of dorsal hairs and a pseudostigmatic organ simply thickened (not globosely piriform).

It is extremely odd that, unless Michael has made mistakes of much the same kind, he would appear to be wrong in identifying his *H. nodosa* with *H. scabra* L. Koch. He figures and describes it as having six rows of dorsal hairs and a short blunt pseudostigmatic organ. I have never seen a creature so characterized, but *H. scabra* L. Koch—with four rows of dorsal hairs and pseudostigmatic organ with distinctly fusiform extremity longer than in Michael's figure—is abundant in Northumberland and Durham, particularly on the coast. Inland it occurs usually on dead wood, but on the coast almost anywhere—in moss, lichen, or salt-grass, or on fresh water algæ in pools. *H. quadriseriata* is plentiful in the neighbourhood of Whitley Bay, always in ground moss.

H. FLUVIATILIS Hull. (Plate C, fig. 8).

A large species, described by me in the current transactions of the Derwent Valley Nat. Hist. Society. I take this opportunity of figuring it. It was first found in moss (from a waterfall) sent to me by Mr. Bagnall from the Derwent Valley. I have since found a single specimen in some wet moss sent to me by the same collector from near the top of Cheviot Hill.

HOPLODERMA Mich.

H. AFFINE sp. n. (Plate C, fig. 9).

Length about 420 μ.

Pale flesh colour; dorsum with a marginal and also a submarginal narrow brown band. Texture of dorsum exactly as in *H. dasypus*—polished and shining, densely but very minutely punctured.

Aspis without carina or markings, uniformly arched.

Pseudostigmatic organs prominent, slender, fusiform, curved outward and forward, rather long, with a fine point.

Abdomen ellipsoid; dorsum with four rows of simple long hairs above, four submarginal hairs at each side of the posterior half, fine and straight, radiating.

Moss in woods; also in sphagnum on the moors, West Allendale, Northumberland; Gibside, Durham. Small forms of *H. dasypus* are usually of the same pale colour as this, and the pseudostigmatic organs are more conspicuous than in individuals of larger size. From such examples the present form can only be distinguished by the longer, more slender, more curved pseudostigmatic organ, and especially by its fine needle-pointed extremity. But the dorsal hairs are also different, being only about half the length of those of *dasypus*; and the submarginal band is much more distinct.

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We have received from the **Selborne Society** its **Handbook** for 1914, containing particulars of the Extension Lecture List, which is well illustrated.

The **Annnal Report of the Yorkshire Philosophical Society** for MCMXIII. has recently been issued. It contains an obituary notice, with portrait, of the late Dr. Tempest Anderson; Notes on the Excavation of Cloister and Restoration of South Nave Wall, St. Mary's Abbey, etc., by W. Harvey Brook; the usual meteorological notes, list of additions to the library, and a well-illustrated paper on Coins: especially those relating to York, by George Benson.

Volume 1, Part II. of the new series of the **Transactions of the Vale of Derwent Naturalists' Field Club** (pp. 72-169, 1s.) contains a lengthy account of the Myriapods of the Derwent Valley, and a paper on the 'Wood Lice of Northumberland and Durham,' by Mr. R. S. Bagnal, ; 'Notes on the Local Mammals and Birds,' by Mr. T. Robson, and Mr. J. E. Patterson writes on 'Nature Pictures.'

The **Annual Report of the North Staffordshire Field Club** for 1913-14, being Vol. XLVIII., edited by W. Wells Bladen (238 pp. 5/-), has been published. It includes the Presidential Address on 'Staffordshire Parishes in their Geographical Aspect,' by S. A. H. Burne. Various notes are on the zoology, botany, geology, meteorology and archaeology of the district, with the reports of the meetings and excursions. Among the more interesting items are notes on the 'Habits of Bats in Captivity'; 'Bird Notes from Stone,' and the 'Breeding of the Willow Tit in Staffordshire.'

The Lincolnshire Naturalists' Union Transactions for 1913, which is presumably part of a volume as it begins with page 71, contains an account of the work of the Rev. E. A. W. Peacock, and his portrait is given, under the heading of 'The Presidents' (sic); Mr. G. H. Caton Haigh's admirable presidential address on the 'Migration of Birds as Observed in Lincolnshire,' follows, and there are the sectional officers' reports, viz., 'Botany,' Rev. E. A. W. Peacock; 'Entomology,' G. W. Mason (including a note of the Bath White in Lincolnshire); 'Coleoptera,' W. Wallace; 'Conchology,' W. Denison Roebuck; 'Vertebrata,' Rev. F. L. Blathwayt; 'Arachnida and Isopoda,' J. F. Musham; 'Foraminifera,' B. H. Quine and A. Smith; and 'Geology,' by H. Preston. The Rev. E. A. W. Peacock writes on 'Our Dry Soil Pimpernels,' and the Rev. A. Thornley and W. Wallace give their seventh valuable contribution to 'Lincolnshire Coleoptera.'

FIELD NOTES.

BOTANY.

'Three-eared' Barley.—A specimen of 'three-eared' barley having been presented to the Louth Museum, by Mr. J. Bainbridge, it was submitted to the Kew authorities, who report: 'It is a specimen of branched or "fingered" barley very similar to the form known as *Hordeum distichum* var. *ramosium* Hochst. The peculiarity is in the replacement of some (in this case two) of the central spikelets at the base of the ear by short ears.' Dr. F. Arnold Lees, at whose suggestion the specimen was sent to Kew, says 'that such teratologic aberrations, which of necessity are all uncommon, throw light on the impulsions of growth, as compelled by external stresses. Evidently the branching energy has not been quite suppressed, but (after a delay) has proceeded to produce a sessile branch, just an ear, without stalk.'—J. Larder, The Museum, Louth.

***Hydrilla verticillata* in England.**—*H. verticillata* of Caspary in the Botanical Zeit. XIV. 899 (1856) was found by Mr. W. H. Pearsall in the Estwaite Water in Lake Lancashire, where it was associated with *Naias flexilis* Rost et Schmidt, and other aquatics. It is a close relation of *Elodea canadensis* Michx, in fact it is a debatable question whether *Hydrilla*, *Elodea*, and *Anacharis* should not be merged in one genus. In Europe it is found in Pomerania, S.E. Prussia, Russia in Wilna, Finland and Witebsk Governments, Asia, Australia, Mauritius, Madagascar, Central Africa. It has many synonyms, and is very rarely found in flower in Europe.—Arthur Bennett.

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BIRDS.

Late Nesting of the Greenfinch.—Recently Mr. Brook of Thongsbridge, near Huddersfield, was surprised to find three new nests of a small species of bird, in his garden. On July 31st one of the nests contained the usual complement of eggs, and on August 10th one of the others contained young birds; the third nest, also containing eggs, was unfortunately blown out of the raspberry bush in which it was built. An unbroken egg from this nest (which Mr. Brook said represented those in all the three nests) was sent to me, and I found it to be that of the greenfinch. Surely it is an unusual experience to find three pairs of this bird breeding in one garden so late in the season.—Geo. T. Porritt, Huddersfield.

It is not unusual to find late (second) nests of Greenfinches. Many are reported this year. There also appears to be many late nests of other species. A brood of Hedge-Sparrows left

the nest on August 23rd. Strange to say the nest was in the Bog's Field, in a much frequented place, close to a much used seat where many boys congregate. It is a matter for surprise that it escaped.—R. FORTUNE.

Long-tailed Skua near Hebden Bridge.—The accompanying photograph is of a Long-Tailed Skua ♀ killed at Withens Reservoir, Cragg Vale, on June 14th. It is now in the

Long-tailed Skua.

Morley Museum. This seems a singular date for the occurrence of this species in this country.—G. PARKIN, Wakefield.

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The Transactions of the Entomological Society of London, Part 5, for 1913, issued May 21st, 1914, contain the Presidential Address of Mr. G. T. Bethune-Baker, on 'The Scales of the Ruralidæ, with some observations on their colour problems.'

We have received from the Royal Zoological Society in New South Wales Part 1 of *The Australian Zoologist*, issued under the editorship of Mr. Allan McCulloch. It is a quarto publication, containing 36 pp. and 4 plates, and contains:—'The Mallophaga as a possible clue to Bird Phylogeny,' by L. Harrison; 'Bird Sanctuaries,' by A. F. Bassett Hall; 'A Monograph of the genus Tisiphone,' by G. A. Waterhouse; 'A New Victorian Araneid,' by W. J. Rainbow; 'Notes on the Breeding Habits of the Purple-striped Gudgeon,' by A. Gale; 'A New Australian Caprellid,' by the Rev. T. R. R. Stebbing; 'Notes on some Australian Syngnathidæ,' by A. R. McCulloch; and 'Bird Notes from the North-west of New South Wales,' by W. F. Froggatt. The publication is well produced, and should prove a valuable factor in connection with the advancement of zoological science in Australia.

REVIEWS AND BOOK NOTICES.

The Animals Friend Society has issued, at the price of 2d. a paper by Mr. Ernest Bell on **The After-Life for Animals.** He deals with such things as re-appearance after death ; telepathy ; the things of the soul, etc.

Messrs. Taylor and Francis have issued a **List of British Non-Marine Mollusca** (12 pp.) by A. S. Kennard and B. B. Woodward, at the small price of 4d. The list now contains 210 species as against 170 since the Conchological Society issued its list 10 years ago.

The Society for the Promotion of Christian Knowledge has issued a little book entitled, **Kindness to all Created Things** with special reference to the Protection of Wild Birds and their Eggs, by W. S. Paget-Tomlinson (2nd ed., 56 pp., 4d.) This was originally given as an address to the children of the Westmorland Elementary Schools.

The Birmingham Country : Its Geology and Physiography by **C. Lapworth** (Birmingham, Cornish Bros., 54 pp. and maps, 2s. 6d.). This model memoir was originally prepared for the Birmingham Handbook of the British Association, and can now be obtained separately from the publishers. Without the maps the price is 1s. The fact that it is written by Professor Lapworth is all the recommendation that is necessary.

The Country Month by Month by **J. A. Owen and G. S. Boulger,** London : Duckworth & Co., 492 pp., 6s. This work, which deals with the various aspects of nature month by month, was originally published in 1901, and re-issued eight years later. The present edition contains many alterations and additions. There are numerous very fine illustrations, including several coloured, and in view of this and the large amount of interesting text, the book is one of the cheapest of its kind that we have seen for some time.

Pond Problems by **E. E. Unwin,** Cambridge University Press, 1914, 120 pp., 2s. The author of this book is well-known to Yorkshiremen, having been science master at Hepworth and Bootham Schools, and also demonstrator in zoology at the Leeds University. The volume is written in a very interesting style, and is well illustrated. The various aspects of pond life are dealt with in a strictly scientific manner, and will especially appeal to teachers anxious to obtain information for their nature study classes.

The Haunts of Bird-Life by **W. P. Westell** , Halifax, Milner & Co., 128 pp., 1s. This is one of the books on British Birds which, according to Mr. Westell, are legion. We are not quite sure what object the present volume serves, as it seems to contain much the same information in it, as do so many of Mr. Westell's books, which however, bear different titles. There are some crude illustrations and a ' selected' bibliography, which of course, contains a good proportion of items by W. P. Westell. The book is well bound.

The Naturalist on the Seashore. By **R. Elmhurst.** London : A. & C. Black, 86 pp., 1s. 6d. net. By the aid of numerous photographic plates, and eight excellent reproductions in colours, Mr. Elmhurst gives a charming introduction to the various Marine Organisms likely to be met with on a typical shore. As Superintendent of the Millport Marine Laboratory, Mr. Elmhurst has exceptional opportunities for observation, and his book has the advantage of being thoroughly scientific, as well as readable. It will particularly appeal to young naturalists.

Bird Studies in Twenty-four Lessons by **W. P. Westell,** Cambridge University Press, 152 pp., 2s. 6d. net. The author truly informs us that books on British Birds are legion. He considers, however, that few of these are especially designed to help pupil or teacher, and that a very real desire for a school book on birds has resulted in this volume. There are illustrations from photographs and some from very crude sketches, some of which (such as the Tree Pipit on p. 35, and the Greater Wheatear on p. 87) we are surprised to find appear in a book issued by this house.

Field Studies of Some Rarer British Birds by **J. A. Walpole-Bond.** Witherby & Co., 1914, pp. xii + 305, 7s. 6d. We have previously referred to Mr. Walpole-Bond's work. The present book contains papers printed from various reviews, etc., and doubtless many ornithologists will be glad to have them in their present form. The chapters deal with Dartford Warblers, Pied Flycatchers, Sussex Crossbills, Cirl Buntings, Choughs, Ravens, Woodlarks, 'The Woodcock' Owl, Hen-Harriers, Buzzards, Eagles, Golden Eagles, The Red Kite, Peregrine Falcons, Hobby, Merlin, Gadwall and Black Guillemot.

Coast Sand-Dunes, Sand-Spits and Sand Wastes by **Gerald O. Case.** London: St. Brides Press, viii + 162 pp., 5s. Mr. Case has had some experience of groyning and of otherwise protecting the land from erosion, and in connection with his work he has gathered together much information relating to different methods adopted for protecting low lying land from erosion. He deals with the advantages of collecting in-blown sand in the form of sand-dunes, which, with the help of man, can serve very useful purposes. The volume is illustrated with a remarkable series of reproductions of photographs taken at home and abroad.

Wild Game in Zambezia by **R. C. F. Maugham.** London: John Murray, 1914, pp. xii + 376, 12s. net. The author of this book is H.B.M. Consul General for the Republic of Liberia, and as an experienced sportsman and zoologist, has had exceptional opportunities for observing the rarer mammals in that paradise for rarities, the Zambezia district. There is nothing technical in his chapters, which are exceedingly well written and informative. He deals with almost all the aspects of big game, both mammal and reptile, and also refers to smaller fry down to birds and tse-tse flies. The volume is illustrated by a large number of very good photographs showing the animals in their native haunts.

The Old Whaling Days by **Robert MacNab**. Whitcomb and Tombs, pp. xvi. + 508. There are a number of books dealing with the nothern whale fisheries, but the literature relating to the southern whaling trade is by no means so extensive. We therfore welcome the present book, which deals with the southern fisheries. It seems that whalers had fished off the northern coast of New Zealand so long ago as 1794, and from that date the various bases and towns of the whaling trade are enumerated, and many stirring and exciting incidents are related. The author also reprints copies of whaling log-books, etc., which throw a flood of light on the hardships of these good old times. There is a very good index.

We have received from the Viking Society further of its valuable publications, viz., Nos. 43—48, of their **Old Lore Series.** These refer to Orkney, Shetland, Caithness and Sutherland, and contain a mine of valuable information relating to these interesting districts. Perhaps the most valuable is a remarkable index published as Part XII. of Vol. I. of the Orkney and Shetland Records. Whoever has compiled it has certainly put students under a debt of gratitude. The Miscellaneous Notes are also very valuable. We should certainly recommend any of our readers interested in northern antiquities to subscribe to the Viking Society, as its publications are alone worth more than the subscription.

A Leisurely Tour in England by **J. J. Hissey.** London: Macmillan & Co., pp. viii. + 396, 10s. net. The author of this work, unlike Stevenson, who had a troublous journey with a donkey, had a reliable motor car which enabled him to thoroughly examine rural England in the Shropshire, Leicestershire, Berkshire, Hampshire and Sussex districts. The book is not a mere guide to the places he has visited, but is a remarkably readable and entertaining volume dealing with just that aspect of rural life which is so peculiar to England. Mr. Hissey's vast experience as a traveller has enabled him to see and record that which is best, and with the aid of a delightful series of photographs and sketches he has produced a book which it will certainly pay anyone to peruse.

Lincolnshire by **Dr. E. Mansel Sympson.** Cambridge University Press, pp. viii + 193, 1s. 6d. From many points of view Lincolnshire has attractions to the geographer, and Dr. Mansel Sympson has succeeded in summarising the various and numerous aspects of the county, as now included under the general term 'Geography.' The Fen country particularly appeals to the visitor, with its wild-fowling, the vanishing woad industry, etc.; while in the north on the shores of the Humber the enormous fishing and ironstone industries give a very different aspect to the county. Architecturally the county is also favoured in having such magnificent structures as the churches, etc., at Grantham, Lincoln, Boston, Louth, Crowland and Thornton. The author deals with the Geology, Natural History, etc., in an interesting manner.

Chats on Old Copper and Brass by **F. W. Burgess.** London: Fisher Unwin, 1914, 400 pp., 5s. He is a bold man now-a-days who can collect objects in brass and copper with impunity. During the past quarter of a century thousands of such so-called antique objects have filled the various curio shops, and numbers of chesnut roasters, candle sticks, etc., which at one time were exceedingly difficult to pick up, are now for sale by the hundred in various parts of the country. Whether Mr. Burgess has been successful in figuring anything but genuine specimens or not, of course we cannot say, but in any event he clearly defines the various objects in brass which he recommends as suitable for collecting, though there are some, such for instance as the cross on the dome of St. Paul's Cathedral, which even the most ardent collector would hardly dare to hope to acquire, Mr. Burgess seems to have touched upon most aspects of brass and copper, and has been assisted in his work by many of the museums.

Engineering Geology by **H. Ries** and **T. L. Watson.** London: Chapman and Hall, 1914, pp. xxvi. + 672, 17s. net. The authors of this work are the respective professors of economic geology in the Cornell and Virginian Universities, and obviously they thoroughly understand the requirements of the engineer. The science of Geology is dealt with in an unusually complete manner from the engineering standpoint, in fact we know of no treatise in the English language which is so thorough and on so lavish a scale. The authors appear to have omitted no particular aspect of geological science that has any bearing whatever upon the work of the engineer, and they deal equally fully with road materials, ore deposits, cements, building stones, harbour works, coast erosion, underground waters, water supply, and the scores of other ways in which geology has an important bearing upon engineering science. The book seems to be very thorough indeed. There are about 250 illustrations in the text, over 100 plates, and an exceptionally good index.

Controlled Natural Selection and Value Marking by **J. C. Mottram.** London: Longmans, Green & Co., 130 pp., 3s. 6d. net. I do not know the author of this book, neither is there anything to show whether it is a man or a woman. We presume it is the latter as right through the point seems to be that the female is the all important individual, while the male counts for very little. The author endeavours to show that all through life and in all circumstances, nature has ordained that 'valueless males may be destroyed rather than valuable females.' The author seems to opine that among insects, when both sexes are present, it is the valueless males that are most readily attacked and eaten by the birds. Similarly in the other natural orders an endeavour is made to prove that the necessary females are best protected and best cared for, and so on. The book deals with conspicuousness in nature; selecting power of enemies; sexual colours; the displays of British birds, and human and other societies. The conclusion with regard to human society indicates the tone of the book, namely 'that competition does not lead to advancement, which is best gained by environmental differentiation or specialisation. Finally it may be said that species rid themselves of males in the following ways: 1. Sacrifice them to enemies; 2. Cause them to destroy one another; 3. Themselves destroy them; 4. Or control their production.'

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Volume II. of the **Proceedings of the Sheffield Naturalists' Club** (72 pp., 2/-), has been published, under the editorship of Mr. C. Bradshaw, and contains the reports for 1913-14. Among the papers printed we notice Field Notes made in July 1903 (Birds in Sheffield district), by Prof. C. J Patten, who also contributes some photographs of birds. Mr. E. Snelgrove refers to an interesting 'Sheffield Plant List of a Century Ago'; Mr. C. Bradshaw illustrates and describes 'Some Calcite Crystal from a Coal Pit at Sheffield,' and Mr. C. F. Innocent writes on 'Dr. Deakin and the Floriographia Britannica.' Mr. A. Brittain gives some 'Observations on Sheffield Univalve Mollusca,' and Mr. A. W. Bartlett describes 'A New

Photo by] **Sweet Cicely.** *[T. Fox.*

Field Botany in the Sheffield district.' The volume forms a very creditable record and the Sheffield Society is to be congratulated on the local nature of its publication. The only complaint we can make is that this small part of 72 pp. should be called a volume. On account of the difficulty in binding, it would have been better as Vol. 2 Part 1. The accompanying block is reproduced by permission of the editor.

The Annual Report of the **Manchester Entomological Society** (56 pp., 1s. 6d.) has just been published, and has a valuable record of the Society's meetings, and lists of local records, as well as Mr. W. Buckley's Presidential Address dealing with his personal experience in collecting and breeding *Acidalia contiguaria*; Mr. J. H. Watson writes a careful account of 'New Hybrids and Races of *Philosamia* and *Antherea*,' which is illustrated by a beautiful coloured plate showing three 'New Saturnidae.' The report contains three plates, the first two of which are not numbered, and the third is numbered plate 1.

Vol. 1, No. 6 of the **Journal of the Torquay Natural History Society**, contains a description of *Squilla Desmarestii* Risso by Major E. V. Elwes, and an abstract of a paper by the same writer on 'P. H. Gosse as a Naturalist.' Mr. A. R. Hunt writes on 'Kent's Cavern: Some Doubts and Difficulties'; Mr. S. C. Chapman on 'Animal Organisms in Water-Pipes,' and Mr. A. J. Jukes-Browne on 'The Lost Land of Torbay.' There is also an interesting sketch of William Pengelly, by his youngest daughter, Mrs. Julian.

NEWS FROM THE MAGAZINES.

The Irish Naturalist for August-September is entirely occupied by a paper on 'The Opisthobranch Fauna of the Shores and Shallow Waters of County Dublin,' by N. Colgan.

Messrs. Hutchinson continue to regularly publish further interesting parts of the *Marvels of Plant Life*, edited by Mr. E. Step. The illustrations in the recent parts are truly remarkable.

British Birds for August contains notes on Long-tailed Skuas in Cumberland, Yorkshire and Ireland. There is also a record of a considerable increase in the Tufted Duck breeding in Northumberland.

In *The Entomologist* for August, Mr. K. J. Morton gives some notes on the British species of *Sympherobius* (*Hemerobius*), including *S. striatellus* (from Nottinghamshire) hitherto unnoticed. In the same journal *Plusia moneta* is recorded for Nottinghamshire; said to be the first record for the County.

Still more corrections. In the *Entomologist's Monthly Magazine* for August, Mr. M. Cameron points out that in that Journal for 1912 he described a new species of *Bledius* under the name of *bernhaueri*, whereas it is now pointed out to him that the name is pre-occupied, and he therefore suggests that the species should be re-named *renominatus*.

The *Quarterly Journal of the Geological Society* for June 30th, reached us on August 5th. Among the papers of interest to our readers are those by Dr. A. Jowett, on the Glacial Geology of East Lancashire, referred to in our Notes and Comments for March last, and on the Lithology of Durham Magnesian Limestones by Mr. C. T. Trechmann; both are well illustrated.

The New Phytologist for June and July includes 'Xerophytic Adaptations of Bryophytes in Relation to Habitat,' by W. Watson; 'Pioneer Investigators of Photosynthesis,' by R. J. Harvey Gibson; 'The Measurement of Electrical Conductivity as a Method of Investigation in Plant Physiology,' by W. Stiles and I. Jörgensen; and a 'Note on the Biology of *Fegatella conica*,' by Annie C. Maybrook.

The August *Journal of the Board of Agriculture* contains a paper on 'The Food of the Common Mole.' In this the author points out that 'if it were desired to form some idea of the soil pests of any particular piece of land no better criterion could be obtained than an examination of the stomach contents of moles taken upon that land.' As a supplement to the Journal has been issued a pamphlet on 'Seed Control Stations on the Continent.'

Among the contents of *The Mineralogical Magazine* recently issued we notice the following:—'The genetic classification of rocks and ore deposits', by T. Crook; 'apparatus for cutting crystal plates and prisms,' by H. H. Thomas and W. Campbell Smith; 'Optically uniaxial Augite from Mull,' by A. F. Hallimond; 'Augite from Bail Hill, Dumfriesshire,' by A. Scott; 'On the occurrence of Bornite nodules in shale from Mashonaland,' by F. P. Mennell; and 'Note on the pleochroism of Adamite,' by L. J. Spencer.

The Duchess of Bedford contributes various bird-notes from Scottish Islands to *The Scottish Naturalist* for August, which are illustrated by eight excellent plates showing breeding haunts. In this she records that on June 2nd she saw two Common Rorquals just north of Spurn Point, on her homeward voyage. They were very close to the yacht at first, and she had a good view of the length and small dorsal fin as they rolled over. After the roll they appeared to skim just beneath the surface for a time, and she saw them blow several times before they disappeared in the distance. In the same journal Mr. J. Ritchie writes on the 'Fauna of a Coal-pit at Great Depths.'

NORTHERN NEWS.

The Reverend Osmond Fisher, the well-known geologist, has just died, in his ninety-seventh year.

The Hon. Sir C. A. Parsons, the inventor of the steam turbine, has received the Honorary Freedom of Newcastle-on-Tyne.

The Sixth International Congress of Mining, Metallurgy, Engineering and Economic Geology, will be held in London from July 12th to July 17th, 1915.

The Curator at the York Museum has tried the experiment of personally conducted tours, and has issued a syllabus covering the dates from August 17th to 28th.

Part XIV of *Yorkshire Type Ammonites* has been received, and deals with *A. spicatus, D. impavidum, A. mutatus, A. ovatulus, A. gracilis, A. heptangularis.* The usual good figures are also given.

The 22nd Annual Report of the Library at *Altrincham* contains a reference to the work done at the museum, which is visited by school children, and in addition general lectures are given on subjects bearing on Museum work.

American Humour. 'You do not speak to him?' 'No,' replied the scholarly girl. 'When I passed him I gave him the geological survey.' 'The geological survey!' 'Yes. What is commonly known as the stony stare.'—*Washington Star.*

The Geological Society of London seems to be getting more and more into arrear with its published work. The list of geological literature added to its library during 1912 did not reach us until August 1914. This we suppose will be due to the recent change of librarian.

The *National Trust* has issued its report for 1913, and it includes a remarkable record of the good work which this society has accomplished, and is still doing. The sketch map published with the report shows clearly the enormous extent of its work in preserving ancient monuments.

We take the following from a recent issue of the *Yorkshire Post*, and trust that things are not quite what they seem with regard to this report:—'The pigs were a grand lot, the Duchess of Anglesey was first and second in the class for first sow any age in pig or in milk, the Duke of Portland being third.'

The Board of Agriculture and Fisheries has issued its *Annual Report and Proceedings under the Salmon and Freshwater Fisheries Acts for the year* 1913. This contains a valuable record of the freshwater fisheries of various parts of the country, and is sold at the absurdly low price of 11d. Accompanying the report is a valuable map showing the districts defined under the various acts.

One by one the alleged evidences of the existence of very early man in this country seem to be disappearing. The famous Elephant Trench at Dewlish, which for half-a-century has been considered by some authorities to have been an artificial trap for elephants, has now been excavated by the Dorset Field Club. Instead of ending below on a definite floor, it divided downwards into a series of deep pipes in the chalk. It has therefore been demonstrated that the trench is natural.

We much regret to find that an illustrated ornithological note which appeared in our August number has also appeared practically word for word, in another journal issued on the same date. No note is so important that it is worthy of being printed in two journals at once. Scientific magazines of any standing usually have difficulty in printing all that is sent to them, and this duplication is alike unfair to the publishers and to the public. Will our contributors kindly note that any paper sent to us must not be sent to another source.

Fig. 1.

Fig. 2.

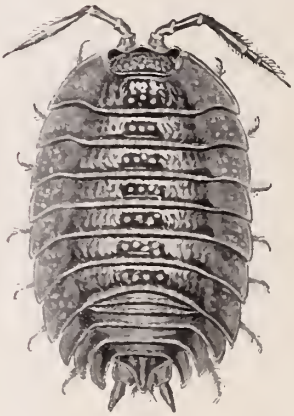


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

WOODLICE.—FIG. 1. *Oniscus asellus*, Linn. ; FIG. 2. *Porcellio scaber*, Latr. ; FIG. 3. *Porcellio dilatatus*, Brandt ; FIG. 4. *Porcellio pictus*, Brandt ; FIG. 5. *Porcellionides pruinosus*, Brandt ; FIG. 6. *Armadillidium vulgare*, Linn. ; FIG. 7. *Armadillidium nasatum*, B.-L. (See page 305).

NOTES AND COMMENTS.

LOCAL SOCIETIES.

At the recent Conference of Delegates of Corresponding Societies of the British Association, held at Havre, Mr. John Hopkinson, F.L.S., F.G.S., read a paper on 'Local Natural History Societies and their Publications.' He said, 'I use the term "Natural History" in its widest sense, as covering the whole of Nature, on, beneath, and immediately above the surface of our earth, and therefore including geology and meteorology. The term "local" restricts the inquiry to societies which are formed to investigate the Natural History of a particular area, such area in England usually being a county. When the county is large, a number of local societies, having their own independent organisation, may federate, forming one composite society, such as the Yorkshire Naturalists' Union; and the several societies in a number of counties may also do so, for example, the South-Eastern Union of Scientific Societies.'

THEIR WORK

'I would therefore restrict the term "Local Natural History Society" to those formed to investigate the Natural History of their locality, and no others I submit have a *raison d'etre*. How then can this object best be accomplished? It would be impossible to form such a society without suitable material; men or women who study Nature. To bring them together the subscription should not be high, nor should there be any distinction of class. All naturalists, whatever their social position may be, should be welcomed and should be invited to bring before their society the subject of their special study. The next essential is an efficient secretary, who, besides having the general management of the society, should study its members, pick out the workers, and induce them to lay the result of their investigations before the society.'

APPORTIONED.

'At first the result may be desultory, but in course of time it will probably become more and more systematic. Thus one member may be induced not only to take meteorological observations, but also to undertake the duty of meteorological recorder, collecting the observations of others, and in every county or nearly so, there is a more or less numerous army of rainfall observers. Another may act as geological recorder, describing sections and photographing them, especially those of a temporary nature. Yet another may be an ornithologist, the camera here again being most useful, and he should be induced to give to the society an annual report on the birds which not only has he observed himself, but also including the observations of his correspondents. The most popular of the

annual reports of the Recorders of the Hertfordshire Natural History Society is that of the Recorder of Birds, not only of our present Recorder, but each one for the last thirty-five years has been so. In botany an effort should be made to compile a flora of the county, phanerogamic and cryptogamic, if there is not one of somewhat recent compilation already in existence, and if there be such a flora the duty of the Recorder would be to keep it up to date by his own observations and those of his correspondents.'

WORKERS AND DRONES.

'In but few localities, however, can such a society entirely rely upon active workers; there must be drones in the hive to supply the necessary funds by their subscriptions, and to add to the numbers attending meetings, and for them it will be necessary to provide popular lectures, which are now almost invariably illustrated by lantern-slides. In selecting such lectures regard should be had, so far as possible, to make them, while entertaining, conducive to serious study, so that there may be from time to time drafted from the army of drones, recruits to swell the less numerous company of workers. The field meetings should be designed to investigate some special subject, for instance, the geology, botany, or some branch of the zoology of a district, under competent guidance, and while they should never be allowed to degenerate into picnics or mere pleasure parties, there is no reason why an occasional invitation of hospitality should be refused. In a fairly large society the workers may be sufficiently numerous to form sections, each with its Recorder or Secretary, but it is only in very large ones that the sections should hold meetings to which the members generally are not admitted.'

PUBLICATIONS:

'The Publications of such societies, I will consider entirely from the point of view of a bibliographer. The question is, therefore: How can the publications be rendered most useful and most easily referred to, and quoted by inquirers on the subjects of which they treat? The Editors of many, if not of most of the Local Natural History Societies of the British Isles, appear to strive to make this most difficult. Therefore I will briefly, and as I have not the time at my disposal to give my reasons in detail, it may appear dogmatically, lay down certain rules which I think should be strictly adhered to.'

HOW PRODUCED.

'However much or however little is printed in a year, a volume with consecutive pagination, or it may be with two series of pages, one with Arabic numerals for the transactions

or papers published, and the other with small Roman or italic numerals for the proceedings or accounts of the meetings, should eventually be produced, and this volume must not be so thin as to tempt two or more being bound in one, nor so thick as to require its being divided when bound. From 300 to 600 pages is perhaps the greatest latitude which should be allowed to a volume, but much will depend upon the thickness of the paper and the number of plates. It is immaterial whether two or more such volumes are produced in a year, or whether one volume takes several years to complete. This volume must have a title-page with the date of its completion and place of its publication, a table of contents at the beginning and an index at the end, and somewhere within it, that is, not only on the covers of the parts which it comprises, the date of publication of each part (month and year), with the numbers of the pages of which each part consists. It can then be ascertained at a glance in what part any paper appeared and the date of its publication. It is also advisable that after the table of contents there should be a list of the plates and of the text-figures, in each case showing their position in the volume.'

REPRINTS.

'When authors are supplied with separate copies of their papers, the original pagination must be maintained, and in such copies, not only on their covers, must be printed the name of the publication, which may be abbreviated, and the volume, part, and date (month and year). As copies of papers may be cut out of a volume it is an excellent plan, now adopted in the 'Transactions of the Hertfordshire Natural History Society,' to print in small type, at the end of each paper, on the bottom of the page, the above particulars, which need not occupy more than one line and look best in italics. If that be done, what a bibliographer requires to know cannot be lost.'*

ANNUAL REPORTS.

'There are very few of these conditions, I may perhaps call them rules, which are generally observed in the publications of our smaller natural history societies. Many such call their publications "Annual Reports." They may consist of not more than one or two sheets octavo (sixteen or thirty-two pages), each Report being separately paged. It may take ten or twenty to form a volume sufficiently thick to bind. As usually they have neither table of contents nor index, to ascertain whether a volume thus made up contains a paper on

* In *The Naturalist* this suggestion has been adopted for many years, except that on *every leaf* the title of the journal, the month and year, is printed; which, with the page number at the top, enables a full reference to be obtained to a paper only a page in length.—Ed.

a certain subject nearly every page has to be turned over. There is, as a rule, no indication of the date of issue, and this is also usually the case with the separate parts of more pretentious publications, which may be called "Journals," "Transactions," or "Proceedings," at least after the covers have been removed, copies without the covers bound in being then absolutely useless to a bibliographer. Sometimes the index appears at the beginning, when one naturally looks for it at the end, such index occasionally being called "Contents." An index is, of course, alphabetical, and it is advisable that there should be only one, and not separate indexes of names, places and subjects. Contents should comprise a list of the papers, etc., in the sequence in which they appear in the volume.'

MATTER PUBLISHED.

'There is only one other point to which I desire to call attention, and that is the nature of the contents of the publications of a Local Natural History Society. The papers printed should be almost entirely those giving the results of original work, and, at least in a small society, for the sake of economy, as little space as possible should be given up to such things as rules and list of members. It will usually suffice when a volume, as already defined, extends over several years, as is frequently the case with a small society, to give such things once only in each volume. Let me give an example of the wrong way, and I may absolve myself from libel if I do not give the name of the society which transgresses. Its last publication is called "Annual Report and Proceedings." It is paged 1-48, not forming part of a volume. Except on the cover there is no date nor place of publication. Its chief contents are the Rules and Library Rules; Additions to Museum and Library; Financial Statement; Hon. Secretary's, Curator's, and Sectional Secretaries' Reports; and Lists of Members, past Presidents, and Associated Societies. The only additions to our knowledge of the Natural History of its locality are contained in a few pages of the Sectional Secretaries' Reports. The subscriptions of its members exceed 200*l.* per annum.'

THANKS TO MR. HOPKINSON

Most of the points raised by Mr. Hopkinson have been referred to from time to time in *The Naturalist*. The examination of various publications necessary in connection with the bibliographies we have issued for many years past, has made us think terrible thoughts about some editors of some publications. How easy would our work have been were they all as careful and as methodical as the editor of the Hertfordshire Society's publications, Mr. John Hopkinson, who, by the way, is a Yorkshireman.

A DYING LOBSTER'S FOSSIL TRACK.

Dr. Bather, writing in *Knowledge* for September, describes a remarkable specimen recently received by the British Museum. It is of special interest, for the piece of limestone not only contains a fossil lobster, but also the tracks which it made when lying on an exposed mud-flat in its endeavours to get back to the water. The lobster evidently died while beating a retreat, backwards, and left its little footprints in the sands of time. Dr. Bather endeavours to account for the animal's death. It may have been wave-borne, or wind-swept, or 'even carried by some fishing form, half reptile and half bird . . . and dropped on a mudflat.' Possibly the riddle may be solved if we read a book reviewed a few pages further on in *Knowledge*, viz., 'The Whole Art of Dying' (*sic*).

COAL MEASURE PLANT CUTICLES.

In *The Geological Magazine* for September is an interesting paper on 'Plant Cuticles from the Coal Measures of Britain,' by Lucy Wills. The authoress refers to the methods previously adopted by Nathorst and others, already referred to in this journal, in connection with the examination of the cuticular structure of Mesozoic plants. In a somewhat similar way she deals with material from the Denbighshire and South Staffordshire coal measures. The cuticles are preserved as brown films in clayey shales, approaching fireclays in composition, none having yet been found in carbonaceous or sandy shales. Several photo-micrographs are given in illustration of this paper. The work described seems to be on entirely new lines, and the results are certainly of great value. It is to be hoped that it will be followed up by other students.

A NEW YORKSHIRE TRILOBITE.

In the same journal, Mr. W. B. R. King describes a new trilobite from the Millstone Grit of North Yorkshire. Numbers of trilobites were obtained from the calcareous beds on Great Shunner Fell, but they are best preserved in a massive limestone bed, which is illustrated in a section given. Mr. King names the new specimen *Griffithides shunnerensis*. He gives a number of figures of the species, and also some interesting notes on the probable former use of the 'pores' on the glabella of trilobites. The specimens are now in the Sedgwick Museum, Cambridge.

YORKSHIRE FOSSIL FLORA.

The Committee appointed to investigate the Jurassic Flora of Yorkshire, presented its report at the recent meeting of the British Association at Sydney. This stated that during the year attention had been concentrated on the plant beds

on and near Roseberry Topping, North-East Yorkshire, more especially on the *Thinnfeldia* beds. A careful search was made for the reproductive structures of *Thinnfeldia*, and this was rewarded by the discovery of numerous associated seed-like bodies, the structure of which has yet to be investigated, and which may, perhaps, prove to belong to this plant. A new example of a *Williamsoniella* flower-bud was found, which is of interest in greatly extending the range of this form. Some fruits and seeds, probably referable to the provisional genus *Caytonia*, were also discovered, though they were previously known only from Gristhorpe. One or two new forms were found, and many duplicates of the more interesting species were collected. It is not proposed to continue field-work and collecting in the future on the same scale as during the past three years until the existing collections have been fully investigated.

A HORNSEA 'EARTHQUAKE' IN 1733.

The following is taken from a rare Broadside dated 1733, which we have recently obtained. It is headed 'A more particular Account than what has yet been published, of the terrible Earthquake that happened at Hornsey near Hull in Yorkshire.' It begins, 'I Have herewith sent you a true and melancholy Relation of a Terrible Earthquake, that befel us on Sunday, *December* the 23*rd*, 1733, which was also attended with several very terrible Claps of Thunder and excessive Lightning, and laid our Town of Hornsey level with the earth' Needless to say there is no evidence for any such earthquake, the narrative being probably based on an account of the effects of coast erosion of which its writer had heard.

AND ITS EFFECTS.

'Alas! No Tongue or pen can express the extreme Horrors of so sudden an Alarm. Our whole Town almost was at once laid flat with the ground. We felt a small shock about the 19*th* of *December*, attended with a rumbling Noise, succeeded by another the day following, which was the Forerunner of the destruction of our Town three days afterwards. But as God would have it, no more than two Men lost their Lives, but upwards of 100 Horses, Cows, Sheep, Hogs, etc., were swallowed up in the Bowels of the Earth; about half a quarter of a Mile on the South Part of the Town stood a Farm House unoccupy'd, which was entirely swallow'd up, so that not a Stone thereof was to be seen. A small Hog-Stye, with some Pigs in it, together with a Part of the Backside of a House remote from the Town, belonging to one Farmer *Goding*, were likewise swallow'd up, and the dwelling-house which stood at some Distance, remain'd unhurt. Our Church was rent in two and at last laid flat with the other ruins; but what is very remarkable thed (*sic*) last Shock began not above an Hour

after divine Service was ended. This is a short but true relation of the Calamitous Condition of our once flourishing Town of *Hornsey*.'

LANCASHIRE NATURALIST.

The Lancashire and Cheshire Naturalist for August is a very good number. Among the articles we notice, 'Plant Associations of South Lancs.'; 'Peat Mosses,' by W. G. Travis; 'The Natterjack Toad on the Wirral Coast,' by R. Standen; 'Aliens [plants] at Birkdale Docks,' J. W. Ellis; 'Fungi of Lancashire Sand Dunes,' by H. J. Weldon; 'Shell Marl in N. Lancs. and Westmorland,' by J. W. Jackson; and 'The Crossopterygian Fossil Fishes of this Area,' by Rev. S. G. Birks. In this last, which occupies nearly 2½ pages, the author tells us it is his intention to contribute papers of this character from time to time. We learn that the author has considered a quantity of new material relating to *Megalichthys hibberti* (the type of which, in the Leeds Museum, was well described by Prof. Miall), and has been able to 'suggest a more complete description of the species than appears to have been given before.' In his description, which occupies just one page, we have failed to detect anything new, nor can we find any new features in his 'restoration of the whole fish, by the author.' For the benefit of his readers, therefore, we trust that in his intended future contributions, the author will explain to us what parts of his brief notes are new.

SPECIALISTS.

We are afraid that the science of Entomology is slowly but surely exceeding the ken of ordinary mortals, and will soon be limited to the efforts of the chosen few whose telescopic optics enable them to distinguish the differences in the length of the snouts of the parasites on mites, and who therefore dub them 'longirostris' or 'brevirostris' as the case may be. It makes us almost sigh for the good old days of half a century ago, when we could read an entomological or zoological journal from cover to cover, and find it all interesting and understandable. We do not wish to deprecate the excellent and necessary work the specialists are doing, but year by year they are reaching heights far beyond the powers of the average student, who tries to follow them along paths which are gradually narrowing, and eventually develop into veritable obstacle-races.

SYNONYMY.

Mr. E. A. Newbury writes in *The Entomologist's Monthly Magazine* for September:—'*Xantholinus scoticus* Joy: synonymical note. This insect appears to me to be identical with what Reitter regards as the type-form of *X. angustatus* Steph.

(= *ochraceus* Gyll.), while the form with the smooth thorax he calls *V. nitidicollis* nom. nov. He is probably mistaken about *angustatus* Steph. He may very possibly be right as to *ochraceus* Gyll.'

RURALIDÆ.

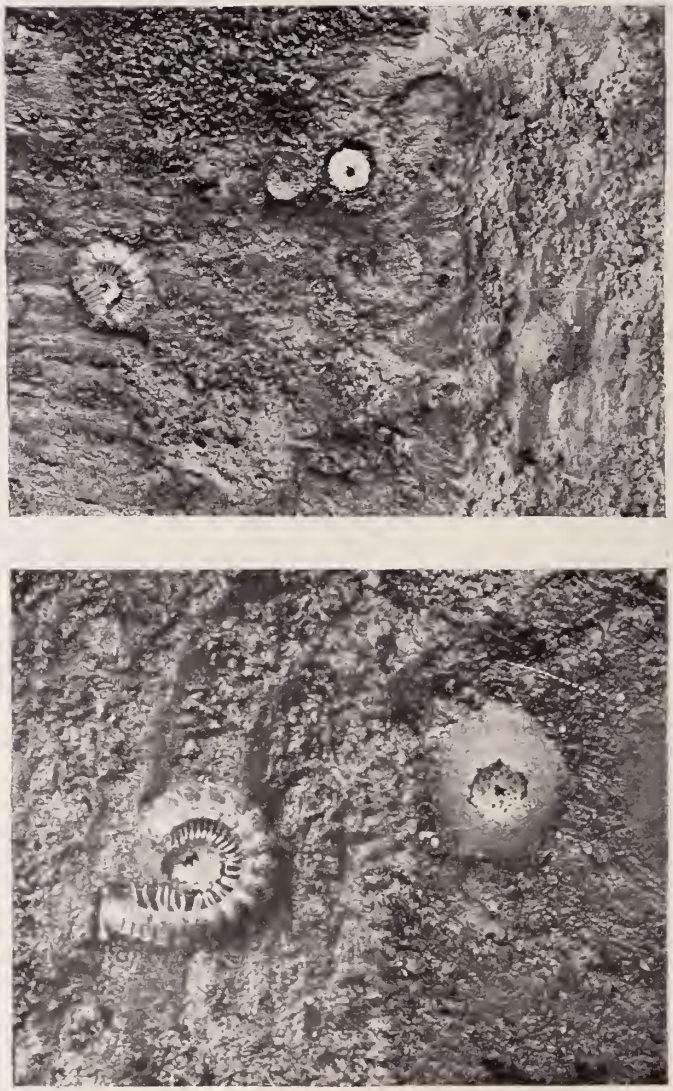
In a recent issue of *The Entomologist's Record*, Mr. G. T. Bethune-Baker gives some valuable and necessary Synonymic Notes on the Ruralidæ. In these the law of priority plays an important part. He demonstrates that in several of the genera considerable revision is necessary—due, in most cases apparently, to the fact that those who have acted as Adam and named insects, have not made themselves sufficiently familiar with the literature. The following extract from his contribution gives an idea of the thoroughness of his work, but at the same time it makes one wonder what will happen when the next worker comes along and re-revises and generally 'plays youraliete' with the Ruralidæ:—

HEODES.

'*Heodes* Dalman. In raising this genus, Dalman mentions only *virgaureae*. This therefore becomes the type. Scudder cites *phlaeas* as the type, but he has evidently overlooked the fact that Dalman only mentions *virgaureae*. . . . *Chrysophanus* Hb., had its type fixed by Scudder as *hippothoë* (loc. cit.). This species is absolutely congeneric with *virgaureae*, and therefore falls before *Heodes*. . . . *Chrysoptera* Zincken (1817). Tutt cited *virgaureae* as the type of this genus, which therefore also falls before *Heodes*. *Rumicia* Tutt, and *Loweia* Tutt. These genera were raised by the author for the reception of *phlaeas* and *dorilis* respectively. I have examined carefully the species, and cannot find a single character whereby to differentiate them from the genus *Heodes*, and I have no question in my mind that the names should be sunk to *Heodes*.' We presume he means 'Hades'!

DERMAPTERA.

In the *Entomologist's Record*, Vol. 26, No. 6., Dr. Malcolm Burr gives some 'Notes on the Indentity of the Dermaptera Described by Thunberg.' In this he forms the following remarkable 'summary':—*Forficula flexuosa* Thunberg, is not *F. flexuosa* Fabr., but a mis-identified macrolabious *F. auricularia* L.; *Forficula dentata* Thunberg, is not *F. dentata* Fabr., but a mis-identified *Auchenomus javanus* Borm.; *Forficula marginalis* Thunberg, stands *F. ochropus* Stal., being synonymous; *Forficula fasciata* Thunberg, replaces the name *lividipes* of Dufour, and the correct name of the species is therefore *Nala fasciata* Thunberg; *Forficula capensis* Thunberg, is a synonym of *Diaperasticus erythrocephalus* Oliv.



Nests of Millepedes.

(See page 305).

TACHYCINES ASYNAMORUS.

In the very next article, in the same journal, Dr. Malcolm Burr writes :—' *Tachycines asynamorus* Adelung, instead of *Diestrammena marmorata* Haan. In a recent article (Ent. Rec., xxv., p. 228, 1913), I recorded the occurrence of this curious Stenopelmatid, at St. Leonards, and in *The Entomologist* for May, 1914 (p. 145), Mr. Lucas also records it from Ipswich, and gives a good figure.' This article concludes, ' I am, therefore, convinced that the St. Leonards specimens, indeed probably all the European captures, are to be referred not to *Diestrammena marmorata* Haan, but to *Tachycines asynamorus* Adelung.'

WOODLICE.

An instructive paper on the ' Economic Importance of Wood Lice,' by W. E. Collinge, appears in No. 3 of Vol. 21 of the *Journal of the Board of Agriculture.* The author points out that in recent years there has been a very rapid increase in the quantities of Woodlice, and in consequence much more damage has been done than has been recorded for many years. He states that unless they are systematically destroyed they may become a source of very serious loss to horticulturalists and others. Instructions are given for the destruction of the pest, and the article is illustrated by a plate showing seven species of Woodlice from Mr. W. M. Webb's well-known work on the subject, which we are permitted to reproduce. (Plate XXIII).

HERTFORDSHIRE NATURALISTS.

The Transactions of the Hertford Natural History Society, Vol. XV., Part 3 (pp. 105-192 + xvii.-xxiv.., 4s. net), edited by Mr. John Hopkinson, is very well illustrated, and may be taken as a fair example of a local scientific society's publication. For many years the Hertfordshire Society has made a stong point of printing information of a local character, and to enumerate even the titles of the various papers would be rather lengthy, but the following selection indicates the scope of the society's work :—' Hertfordshire False-scorpions ' ; ' The Crustacea of West Herts. ' ; " On the Strata recently exposed in the Railway Cutting between Oxhey and Pinner " ; ' Notes on Birds observed in Hertfordshire ' ; ' A Note on the Occurrence of *Palmodictyon viride* in Hertfordshire.' The accompanying photographs (Plate XXIV.), show Millepedes' nests, which appear in a paper by Mr. Hugh Main in the same transactions.

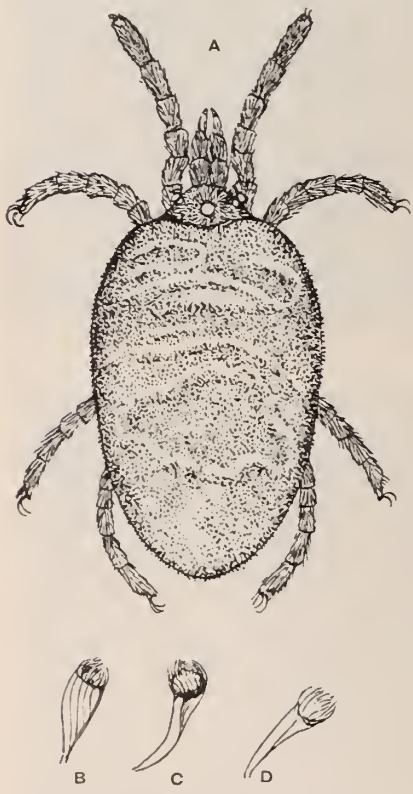
——: o :——

Mr. H. Hamshaw Thomas, M.A., whose work on the Jurassic flora of Yorkshire is well-known, has been elected a Fellow of Downing College, Cambridge.

A NEW TROMBIDIUM: OTTONIA IGNOTA n. sp.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

THIS is one of those handsome Trombidii in which the colour is deepest in the papillæ, hence some of this remains even after mounting in Balsam. It is difficult to point out any one constant anatomical difference whereby it can be easily recognized. It is of moderate size, the length 2·35 m.m., the width at the widest part 1·50 m.m., the posterior end of the body is rounded, not emarginate, the position of the anterior part of the crista is conspicuous in consequence of the arrangement of the papillæ in a circular form. Its minute anatomy is, however, rather difficult to make out for the same reason, and I have not dissected it. I have, however, observed the two stigmata with their protecting hairs so often found in this portion of the crista. The eyes are very prominent on each side of the cephalothorax, each having two ocelli. The papillæ or hairs on the back and sides are most remarkable, consisting of an inverted cone with stalk at the apex, the outer and upper edge fringed with minute hairs. Some of the papillæ appear to be barrel shaped. Mr. Soar has drawn three papillæ, enlarged; their average length is about 0·04 m.m. The mite, of which only one example was seen, was found by Mr. Wm. Falconer amongst the débris at the roots of *Calluna* on the summit of Holme Moss, S.W. Yorks., at an elevation of 1750 feet, on the 13th June, 1914.



A.—***Ottonia ignota* n. sp.**
B, C, D.—Papillæ.

YORKSHIRE NATURAL HISTORY 200 YEARS AGO.

While we proceed with our new records and details of new discoveries, as recorded in the pages of *The Naturalist*, it is perhaps as well now and again to look back upon what was considered to be natural history, in the beginnings of that science.

There has recently come into my possession a copy of a small quarto work, dated 1731, Vol. 6 of which contains particulars of the Counties of Westmorland, Wiltshire, Worcestershire and Yorkshire. The Yorkshire section occupies pages 331-710, and contains descriptions of the three ridings, with maps, and occasionally crude illustrations in the text. At the end of this section is a folding plate with the coats of arms of 'York, Kingston-upon-Hull, Knaresborough, Scarborough, Rippon, Richmond, Beverly, Thirske, Malton, Burrowbridge, Heydon (Hedon), North Allerton and Pontefract.'

This plate also contains an elaborate table, apparently of distances between different points in the county. This seems to be fairly generally accurate, but as there is no 'explanation' it is a little difficult to understand how the distance between Bridlington and Bridlington comes to be 165 miles, and between Hull and Hull, 135.

Though the volume is dated 1731, there seems to be evidence that parts at any rate were written at an earlier date; and to put the period of the authorship of the following notes as two centuries ago is certainly well within the mark.

The Yorkshire section is divided into three parts, one for each Riding. And each section contains a chapter on Natural History, which is of interest, as it gives an idea of what the authors considered 'Natural History' to be, as well as some account of the appearance of the county two centuries ago. Unfortunately it is also apparent that much of the information has been compiled, as the places are not always quoted as in their correct Ridings; and the reference to 'pit-coal' being plentiful in the East Riding shows that all the statements made are not from personal observation.

In the pages there are many evidences of the different aspects of the county in former times. It is also a little unexpected to find that 'natural history' was divided into four sections, viz., Air, Earth, Water and Fire!

Much attention was paid to the spaws and springs. 'Giglswick' was even then 'the most noted spring in England for ebbing and flowing.' Harrogate was unknown, and its praises are unsung, but the 'sweet spaw of vitrioline well discovered

by Mr. Slingsby about the year 1620,' and the stinking or surpher (*sic*) well, and others, were described under the head of Knaresborough—then a not unimportant place. Knaresborough legitimately boasted its Dropping well, 'the most famous of the petrifying wells in England.'

Even Leeds had four important medicinal springs, one of which was more or less appropriately termed 'High Dam,' and near another was kept the Ducking Stool, which doubtless, had something to do with its 'virtues surpassing all the rest!'

Scarborough had its Spaw-Well, the waters of which had a pleasant acid taste from the Vitriol, and an 'inky smell.' At Scarborough there were 'no Walks nor publick diversions.'

There was also a spring of waters on the top of Roseberry Topping, which was good for diseased eyes. Even Beverley had its spaw on Swinemoor, the waters of which killed 'Scarbutick scurf,' and helped the King's evil!

There are early references to the quarries for Alum, Jet, 'Copperas,' etc. There are quaint remarks on Whitby fossils. Near Whitby the air was so strong on one part that wild geese dropped down dead in attempting to fly through it, quite probably 'to the great Amazement of all Beholders.'

The reference to the stocking of Pool *Semur* (Semmerwater) with crayfish from the south of England, by Sir Christopher Medcalfe, is also of interest, especially as the species still exists in that sheet of water, as was proved on a recent excursion of the Yorkshire Naturalists' Union.

The first section is headed 'The Natural History of the West Riding,' and occupies pages 444-448. 'The Natural History of the East Riding' occupies pages 569-571, and 'The Natural History of the [North] Riding,' pages 642-649.

In this last section is a list of 'Plants growing wild and plentiful in this County, but rarely, or not at all in most others.'

This is in the North Riding chapter, and follows on the general natural history notes without any break whatever, though the list is obviously intended to refer to the county as a whole. This list of flowering plants and mosses—and even sea-weeds—is a particularly early one, and is probably based on the works published a few years previously by Ray, the naturalist.

T. S.

The following is a copy of the title of this section of the work :—

MAGNA BRITANNIA
ET
HIBERNIA,
ANTIQUA & NOVA.

OR,

A New Survey of GREAT BRITAIN, wherein, to the Topographical Account given by Mr. *Cambden*, and the late Editors of his *Britannia*, is added a more large History, not only of the Cities, Boroughs, Towns, and Parishes mentioned by them, but also of many other Places of Note and Antiquities since discovered.

Together with

The CHRONOLOGY of the most remarkable Actions of the *Britains, Romans, Saxons, Danes*, and *Normans*. The Lives and Constitutions of the Bishops of all our Sees, Founders and Benefactors to our Universities and Monasteries, the Sufferings of Martyrs, and many other Ecclesiastical Matters. The Acts and Laws of our Parliament, with the Place of their Meeting. A Character of such eminent Statesmen and Churchmen, as have signalized themselves by their wise Conduct and Writings. And the Pedigrees of all our noble Families and Gentry, both Antient and Modern, according to the best Relations extant.

Collected and composed by an impartial Hand.

VOL. VI.

Containing the Counties of *Westmorland, Wiltshire, Worcestershire*, and *Yorkshire*.

In the *SAVOY*:
Printed by E. and R. NUTT; and Sold by T. Cox at the *Lamb* under the *Royal Exchange, Cornhill*. M.DCC.XXXI.

The Natural History of this West Riding.

WE cannot but begin this Part of the Natural History of *Yorkshire*, with the extraordinary Situation of *Hasselwood*, the Seat antiently of the famous Family of the *Vavasors*, near which is the remarkable Quarry, called *Peters-post*, out of which the stone, which built the Cathedral Church of *York*, dedicated to St. *Peter*, was hewed, given by the *Vavasors*. This Town affords a very pleasant Prospect; for the two Cathedrals of *York* and *Lincoln*, tho' sixty Miles asunder, and much of the Country and Towns between them, may be from thence discovered; and *Tunstal*, Bishop of *Durham*, affirmed to King *Hen.* VIII. when he was in his Progres to *York*, that the Country round about for Ten Miles, was the richest Valley that he ever found in all his Travels through *Europe*, there being in it One hundred sixty-five Manorhouses, the Seats and Possessions of Lords, Knights, and Gentlemen of the best Quality; Two hundred seventy-five several Woods (of which some of them contain Five hundred Acres) thirty-two Parks, and two Chases for Deer, One hundred and twenty Rivers and Brooks, (whereof seven are navigable) well stored with Salmon and other Fish, seventy-six Water-mills for grinding Corn, twenty-five Coal-mines, three Forges for making Iron, and Stone enough to supply the same with Materials to work on; and besides this, within these Limits, as must Sport and Pleasure for Hunting, Hawking, Fishing, and Fowling, as in any Part of *England*. It is possible and probable, that from that Time to this many Alterations have happened by demolishing Houses, cutting down Woods, &c. but although the Face of Nature may be disguised, the Features of so admirable a Region will still remain; but to come to a more particular History of Nature's Bounty to this Part of the Shire, we shall continue to make Use of our former Method in treating of the,

1. *Air.* 2. *Earth.* 3. *Water*; and 4. *Fire.*

1. Of the Air, which is more wholesome and healthy in this Riding than in the other two Ridings, the East and North, because they border upon the *English* or *German* Ocean in some Part or other; for the Unwholesomness of Air proceeds generally either from the Sea, Marshes, or other Fens and Bogs, of which this Riding is as free as any County in *England* is, or can be; for Rivers and Pond Fogs are common to all them, more or less; and being not so noisome as others, do very little prejudice the Air. There was antiently on the East-Side of this Riding a River Island, called *Marsh-land* to this Day, which was once over-run with Water, and so probably infected the Air with unwholesome Fogs; but it hath been for some Years drained at the Charge of the Gentlemen of the Neighbourhood, in the Reign of King *Charles* I. and

now Part affords good Pasture and arable Land, and the other parts are dug for Turf, and so made of very great Use to the Inhabitants; and that the Air is not esteemed less wholesome than other Places of this Riding, may appear plainly from the Multitude of Villages situate on the Borders of it, and *Thorn*, a well inhabited Market-Town in it. But as harmless as the Air is there, surely 'tis much more healthy and wholesome in the upland Parts of this Riding, especially in *Craven*, which is not only hilly, but is higher than the other Parts, as is beyond Contradiction evident from this, that all or most of the Rivers of this Riding, which are some of them very large, have their Rise among the Mountains there, and pour their Waters down into all Parts of it; and so pass into the *Humber*, or other Counties.

2. The Earth, or Soil of this Riding, as well as of the other Two, as to its Fruitfulness, is of a mix'd Kind. If in one Place it be of a stony, sandy, or barren Nature, in another 'tis pregnant and fruitful; and so if it be naked and exposed in one Part, it is clothed and sheltered with great store of Wood in another, being thereby made beautiful by that Variety. The hilly Parts are barren, and lower Vallies fruitful; so many Rivers, and some of them large, can't but produce much meadowing and good pasture Ground; and both by the Improvement of the Inhabitants are rendered very profitable in breeding Oxen and Sheep of the largest Size, sufficient to stock many Parts of *England* with Cattle for fatning. Nor is their Soil in many Places unfit for Ploughing, though the Product is not so plentiful for Wheat and Barley, as Oats; nor do they want Dairies equal to other Counties, some few excepted, as *Cheshire*, *Warwickshire*, &c. Besides the Trees of common Growth in all Parts of *England*, here are some not usually found in other Counties, as Firs, Yews, and Chesnuts. Nor doth this Riding only afford Plenty of Necessaries, but much for Pleasures, as Parks and Chases, which are very frequent here. But there are other Things remarkable in the Soil of this County, which are not found in others; as in this Riding, Mines of Lime-stone, which is plentifully dug up in *Elmet*, and near *Tadcaster*, which being burnt at *Brotherton* and *Knottingley*, is at certain Seasons conveyed in great Quantities for Sale to *Wakefield*, *Sandal*, and *Standbridge*, from whence it is sold into these western parts, which are naturally cold and mountainous, to improve their Land, and for other Uses. At *Huddleston*, near *Shirburn*, also is a noble Quarry, out of which when the stone is first cut, it is very soft; but lying in the Air a-while, it presently consolidates and hardens. There is also another Quarry within half a Mile of *Aldmonbury*, which is built of Stones dug out of it in a great part. The Edges of the Stones are black, which appearing in the houses so built, the Inhabitants will have that Blackness to be a Proof

of the Town's being burnt down; but that is a groundless Proof, because the Stone in the Quarry is so edged, and that so deep, that 'tis not probable any Fire can come there. In most of the Hills between *Scarborough* and the River *Tees*, there is a Stone found of which the People make Allom; it is of a bluish Colour, and will cleave like *Cornish* Slate. The Mine lies deep, and requires great Pains to dig up; but being calcined, it is made into Allom by various Percolations and Boilings, which is most distinctly related in the Philosophical Transactions, *Louth*. Vol. II. p. 538. To this Head may be referred several other Things for which this Riding is famous, as fine Horses, Mines of Allom, and Jet; Iron about *Sheffield*, and Pit-coal, Goats at *Sureby*, *Ripley* for Liquorice, &c.

3. Waters, for which this Riding is very eminent, having several great and navigable Rivers, besides Multitudes of Brooks gliding into them; as, 1. The *Ouse*, the principal River in this Riding; if not for its Largeness, yet for this, that all the other Rivers in this Riding are received into it; and so in one Chanel run into the *Humber*. It begins to take its Name about *York*, from a little Brook which falls into it there, called *Ouseborne*, being before called *Ure*. It runs gently from North to South quite through that City, and divides it into two Parts, which are joined together by a very large stone Bridge, which hath but one Arch. On the South-East of that City is the River *Fosse*, which is very deep and muddy, and running by obscure Ways in to the City, 'tis scarcely discernable, 'tis so set with Buildings, falls into the *Ouse*, which having passed *York*, begins here and there to be disturbed with Eddies, *i.e.* those Whirls of Water called *Hidras*, and so passeth on, dividing this Riding from the Eastern, till it empties itself in to the *Humber*, receiving into it in its Passage the River *Wherfe* at *Nunappleton*, and the River *Are* near *Drax*, being there increased by the *Done*, *Went*, and other Rivers. This River is navigable up to *York*, and on that Account is not only of great Benefit to it for the Plenty of Fish, *viz.* Salmon, and other common River Fish, but the great Traffick that is produced thereby in that City by merchandizing. 2. The *Ure*, which springing out of the western Mountains in the *North-Riding*, becomes a Boundary to this western Riding on that Side, till it comes to *York*, where it changes its Name into *Ouse*. Our Antiquaries are of Opinion that the Old City *Isurium Brigantum*, long since demolished, and *Eboracum* or *York*, took their Names from this River *Ure*, which also supplies the northern Parts of this Riding with Store of Fish. 3. *Danus*, commonly called *Don* or *Dune*, because it runs in a low deep Chanel, for that's the Signification of the *British* Word *Dan*. This River is remarkable for the Plenty of Alders, Yews, and other Trees growing on

the Banks of it, and giving to a great Town, situate on its Side, the Name of *Doncaster*, it rises upon the southern Border of this Riding, and diving itself into two Channels about *Doncaster*, takes in the Brook *Went*, and so passes by the Isle of *Marshland* into the *Ouse*. It is of great Service to these southern Parts for its Water and Fish. 4. The *Calder*, which flows along the Borders between this Riding and *Lancashire*, hath at first but a small Current; but being supplied with the Waters of divers Rivulets, becomes so large about *Estland*, that it is not passable but by a Bridge, from whence it runs many Miles, still augmented by many Brooks, five Miles beyond *Wakefield*, and there empties itself into, 4. The *Are*, a large River issuing from the Root of the Mountain *Pennigent*, (which is the highest Hill in these Parts). It at first seems doubtful, whether it shall run forwards into the Sea, or return to its Spring; for it is so winding and crooked, that in travelling hereabouts it is passed over seven or eight times in Half an Hour in a strait Road. Its Course is calm and quiet, even so easy that it hardly appears to move; and that is the Reason of its Name; for the *British* Word *Ara*, signifies slow and easy. The Head of this River lies in this Part of this Riding called *Craven*, from the *British* Word *Crage*, a Rock; for what with huge Stones, steep Rocks, and rough Ways, this Tract is very wild and unsightly. This River holds on a long Course, quite cross this Riding almost, before it falls into the *Done* near *Snath*, and so passes into the *Ouse*, affording pleasant and fruitful Meadows, and Pasture all along its Current, and Plenty of good Fish. *Bondman's Dam*, upon this River deserves our Notice, (1.) Upon the Account of the Tenure with certain Copyholds, which were charged with the Repairs of it, sometimes to their great Charge as well as Toil; but to compensate this slavish Tenure, they were Hopper-free, *i.e.* had their Corn ground immediately as soon as the Hopper was empty, though never so many waited. 2. In Gratitude for the Abolishing the Bond-Law, whereby not only the Lands and Services, but the Bodies of these Tenants, and their Children, were sold or given away, as Cattle by their Lords. *Fox Martyrol. Tom* 1. *p.* 120. *N.E.* The River *Ribble*, (which we shall not number among the Waters of this County, because it passes so soon into *Lancashire*) must not be forgotten here; because it rises in these Mountains of *Craven*, and holds on a Course of forty Miles before it leaves this Riding, receiving in its Way a considerable Brook, called *Hudor*, rising on the Side of *Bowland* Forest, but having spoken of that in *Lancashire*, we shall pass to, 5. The *Wherfe*, which hath its Rise out of the Foot of *Craven* Hills. In *Saxon* it is written GUERR, which may well be derived from *Guer*, a *British* Word, signifying *Swift*, for such is the Nature

1914 Oct. 1.

of the River, having a Torrent swift and violent, fretful and angry as it were, at the Stones that hinder its Passage. In the Winter-time, when it is swelled by Rains or dissolved Snow, it rolls along after a surprising Manner; and though it abates of that in Summer, yet even then 'tis dangerous to pass over, partly for its Rapidity, and partly by Reason of the Slipperiness of the Stones, so that an Horse cannot get firm Footing in it. It hath a long Course in this Riding, *viz.* above fifty Miles, before it falls into the *Ouse*, keeping for a great Way an equal Distance of about ten Miles from the *Are*. Among other small Rivulets, or Brooks which fall into it, the *Wasbrook* and *Cock* are very considerable; as is also that nameless one that gives Name to *Shirburn*. This also affords Plenty of Fish, and is of great Conveniency to the People of this Riding. Having thus given an Account of the Waters of common Use we shall proceed to those of a different Nature, preternatural and physical; as,

1. At *Gigleswick*, where at the Foot of a very high Mountain is the most noted Spring in *England* for ebbing and flowing, sometimes thrice in an Hour; and the Water subsides three Quarters of a Yard at the Reflux, though it is thirty Miles from the Sea.

2. Near *Knaresborough-Castle*, which being demolished, and scarce discernable where it was, is now famous only for the medicinal Springs by it, which are four Sorts, *viz.* 1. The sweet Spaw of vitrioline Well, discovered by Mr. *Slingsby*, about the Year 1620. 2. The stinking or surpher Well, said to cure the Dropsy, Spleen, Scurvy, Gout, &c., so that what was before called the Dishonour of Physick, may be deservedly called the Honour of *Knaresborough* Spaw; the late Way of Bathing in it being in these Diseases found very Sovereign. 3. St. *Mongah's* (not *Magnus's* or *Mungus's*, as the Vulgar for the most part call it) or *Kentegern's Well*, a Saint much honoured in old Time in these Parts, whom *Servanus*, Bishop of *Orkney*, loving above others, used to call *Mongah*, *i.e.* in their northern Dialect, a Dear Friend. 4. The *Dropping-Well*, the most famous of the petrifying Wells in *England*, whose Water doth not issue from the Bowels of the Earth, but distills in Drops from the Rocks hanging over it, and from thence takes its Name of the *Dropping-Well*. Its strange petrifying Nature appears in this, That if a Piece of Wood be put into it, it will in a little Time, not only be crusted over with a stony Substance, but by longer Continuance in it be turned into Stone. The Ground on which the Water drops before it unites in the Well, for twelve Yards together, is become a solid Rock. From the Well it runs into the River *Nid*, where the Water of it hath made a Rock, which stretches some Yards into the River. These four Springs are near one another, and so different in their medicinal Virtues, that they are a Rarity no where in *England* to be parallelled, or any where else perhaps.

(*To be continued*).

Gannet with Normal Eyes.

Photos by [*R. Fortune.*

Gannet with Abnormal Eyes.

GANNET WITH ABNORMAL EYES.

R. FORTUNE, F.Z.S.

(PLATE XXV.).

WHILE on the Bass on August 3rd, my attention was drawn to a Gannet with abnormal eyes. The pupil was very much larger than usual, and as far as I could tell, of an intense black, surrounded by a narrow ring of pale blue.

The bird, despite the fact that she had a young one, was unusually shy, and although she frequently alighted near her offspring, she was off again at once. The day was unfortunately a dull one, with occasional showers and a very high wind, making photography with a stand camera a somewhat difficult task; otherwise better photographs might have been obtained; nevertheless I think those reproduced will fully illustrate the remarkable feature referred to. Any variations from the normal in the Gannet family are very rare.

When a south-west wind is blowing, clouds of Gannets are continually flying along the front of the great west cliffs, in face of it, until they come to the corner where the full blast of the wind is felt, they then wheel round and return, to again fly up in face of the wind. This is one of the most wonderful sights in bird life. It is extremely fascinating to be perched on the cliff top watching the marvellous procession of huge birds, with their wing spread of six feet or over. It seems to me that the birds treat the matter as a sort of sport, to show how little they care about the wind, no matter how strongly it blows. The command of the air, which they have, is really marvellous. I have watched them sail up in the teeth of the wind without any apparent movement of the wings, then allow the wind to get underneath and drift them back again without any effort of their own. I have seen birds poise themselves in mid-air, bring their foot forward and scratch their heads. Now and then one sees a bird give a pull at another's tail. It is wonderful how in the midst of these thousands, collisions are so seldom seen. On this day a bird of last year dashed into an old stager. The shock did not affect the older bird, but the young one dropped down at bit, evidently somewhat dazed. He however, soon recovered, and sailed away as if nothing had happened.

In the continuous stream of birds flying past, hundreds came so close, that it would have been an easy matter to have knocked them down with a stick. It was easy to follow our bird, whom we christened 'Black-eyed Susan,' amongst the numbers in the air, her eyes were so very conspicuous.

In the pictures one noticeable feature is illustrated. In a photograph, the normal eye of a Gannet frequently has a

sunken appearance, like the eyes of statues, whereas in 'Susan's' it stands out bold and full.

It is remarkable how little notice the sitting Gannets take of an intruder, an occasional peck as you pass close by is the only attempt at attack I have noticed, until this year. I had passed a bird covering a newly hatched youngster. She was especially noisy, and apparently objected strongly to my presence. When I got a few yards away, with my back to her, she came at me with a rush and gave me a severe peck on the calf. One of the light-keepers has a nasty wound on his wrist, the result of a blow from the beak of a young bird. I can quite imagine that if care is not exercised in a case of this kind, there would be a considerable amount of danger from blood poisoning.

It is, however, a good thing that these big birds do not recognise their own power. When on the Farnes in July, an Arctic Tern escorted me practically all round the Knoxes, repeatedly dashing down and giving me a peck on the top of my head, and some of the blows were fairly sharp ones. I could not help thinking at the time, as I have often thought, that if Gannets developed the same habit, it would be a dangerous job visiting such haunts as the Bass!

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The late Rev. O. Fisher has bequeathed his geological collections and library to the University of Cambridge, and his Wollaston and Murchison medals to the Dorset County Museum.

A paper on 'Standing Stones in Yorkshire,' in which the Rudstone and Boroughbridge examples are illustrated, appears from the pen of Mr. A. L. Lewis in *Records of the Past*, Vol. XIII., Part 2.

Dr. J. W. Evans' presidential address to the Geologists' Association deals with 'The Wearing Down of Rocks—Chemical Action in Terrestrial Areas,' and is printed in the Association's *Proceedings*, Vol. XXV., part 4.

The Sheffield Daily Telegraph reports that 'A sow has given birth to a freak of nature. The animal's face is almost human in appearance, it has neither eyes nor nostrils, but a nose like a fish.' To this *Punch* adds, 'This is like none of our friends.' But has Mr. Punch any friends in Sheffield?

We have made remarks about newspaper natural history from time to time, but the following criticism of an article which appeared in the *Daily Chronicle*, is taken from the *Entomologist's Record*. 'H.J.T.' there describes the article in the 'Daily' as 'probably unique as an illustration of crass ignorance, misapplied energy, aberrance of observation and assumption of scientific knowledge.' We take off our hat to 'H.J.T.'

According to the press, 'Two hundred horses of the North Midland Mounted Brigade stampeded from camp at Bishop's Stortford early one morning. Fourteen were killed!' The rumour is not true that a certain geologist threatened to read a paper to them on 'The Pre-historic Horse from Bishop's Stortford'; but we are inclined to believe the further rumours that a paper on a find of 'Fourteen Prehistoric Horses at Bishop's Stortford,' is already on the list for reading at a future meeting of the British Association; if the author can find a section that will take it!

YORKSHIRE NATURALISTS IN ESKDALE.

WELL chosen was the locality for the last week-end excursion of the Union, for there are few places to compare with the majestic beauty of the numerous dales arising along the course of the Esk ; glorious valleys full of varying interest, terminating in wild heather-clad moorlands, and with diversified scenery that cannot fail to give infinite pleasure to the nature lover.

Headquarters were at Sleights Hall, a fine mansion with delightful gardens, in which are many well-grown trees and shrubs. Particularly conspicuous were two examples of Lime, *Arbutus Unedo*, in fruit, *Olearia hasti* with its wealth of creamy blossoms, and *Spiraea engardi*, as well as plants of *Acanthus spinosissima* bearing giant bloom spikes.

A moderate number of members stayed over the week-end, whilst undoubtedly the withdrawal of the excursions trains on the Monday militated against a larger number being present on that day. The absence of the President of the Union (Mr. Thomas Sheppard, F.G.S.) was accounted for by his representing the Union at the meetings of the British and French Associations at Havre.

On Saturday the party trained to Egton, first visiting the gardens at Egton Lodge, finding much of interest in the rock garden, which contained many specimens of plants. They were there met by Mr. Twinham, who conducted them through East Arncliffe Woods to the site of the supposed British Pit dwellings. Subsequently the party went to the Memorial Institute at Glaisdale where an excellent tea was provided by Glaisdale friends, who were heartily thanked for their kind hospitality. The response of Dr. E. H. Davis brought to a close a most enjoyable outing.

On Sunday most of the members drove over the moors to Saltersgate, for an inspection of the Hole of Horcum, arriving at noon, but rainstorms of exceptional violence completely spoilt what would have proved a profitable excursion.

However, Mr. Burton explained the theories concerning the forces which were considered to have caused the formation of this immense valley, with its converging gorges and narrow outlet. His recital of the local legend as to how the Hole of Horcum and Blakey Topping owed their origin was vastly entertaining.

Briefly, 'twas thus. A giant and his wife, known by the name of Hob, were busily engaged in the erection of castles at Pickering and Mulgrave. Their only offspring was a boy, who, in wanton mood made human 'duck-stones' of his parents by pelting them with sundry loose chunks of rock which lay at hand. Naturally the wrath of the parents was great at this unseemly treatment, so Mrs. Hobs rose in her might,

and seeking means whereby to chasten the pride of her heart, scooped up materials on her way from Pickering, thereby making the Hole of Horcum ! Continuing her chase of the youngster, the strings of her apron broke, and the materials falling to the ground formed what is now known as Blakey Topping !

On Monday all parties, under the guidance of Mr. Burton, proceeded over the fields from Sleights to Little Beck, and spent the day in the charming Valley of Little Beck, which proved most interesting to workers in most sections, but exceptionally so to the botanists. The majority did not proceed further than Falling Force, a few however partly explored the May Beck Valley.

At the meeting held at the close of the excursion good reports were given of the work which had been carried out, and cordial thanks were accorded to Mr. Burton for the admirable manner in which he had made the local arrangements, which were a distinct success, and also to Dr. E. H. Davis, Mr. Kenneth Foster and Mr. E. C. Brooksbank for the kind permissions to visit their estates

W.E.L.W.

Botany.—Mr. W. E. L. Wattam writes :—The features of east Arncliffe woods are the precipitous slopes strewn with great stone blocks and débris washed down from the calcareous rocks above, which, to some extent, influence the ground vegetation, as evidenced by the extensive sheets of Dog's Mercury and Enchanter's Nightshade. The abundant supply of moisture was reflected in the richly moss-grown blocks. The woods, which are of great age, whilst containing many introduced trees, are probably the descendants of a primitive oak forest.

The chief objective in visiting the Hole of Horcum was to find the Dwarf Cornel (*Cornus succica*), but although part of the ground was worked the rain storms stopped further investigation. The general vegetation of the surrounding moors is of the silicious heath type, whilst the influence of lime on the summit of the hill looking down into the valley was shewn by the presence of Hoary Plantain, and an abundance of Wild Thyme. A little *Vaccinium vitis-idaea* was noted, as well as *Orchis maculata* and Bog Pimpernel. Where paring or firing had taken place on the moors the ripened panicles of *Aira praecox* were very noticeable.

Little Beck Valley proved most interesting botanically. Just before entering the wooded portion a mass of the aromatic *Origanum vulgare* gave quite a display of bloom. The arboreal features of the valley are exceptionally fine. On the precipitious banks of the gorge for some distance were ex-

cellent examples of the Oak, Common Ash, Mountain Ash, Wild Cherry and Larch, whilst towards the head of the valley terminated by Falling Force, the Mountain Elm, Sycamore and Common Ash are the dominant trees. The Broom is a most common shrub, reaching to an immense size, the stems being crowded with ripened seed pods. Seedlings of this plant could be obtained in varying stages of growth, and other seedlings noted were those of the Common Furze, Common Ash, Mountain Ash, Oak, and Wild Rose. That the Bracken was the first conqueror of the alum shale mounds was well evidenced in several parts of the valley. This fern also spreads in extensive sheets on the débris washed down from the rocks, and along with it was a heath association of plants, Dwarf Bilberry, Ling, Fine-leaved Heath, Tormentil, Ladies Bedstraw, and *Deschampsia flexuosa*. *Bromus asper* is the common grass of the valley. The more shaded and moister portions of the upper part of the valley exhibited a ground vegetation dominated by *Lastrea Filix-mas* and its variety *Borreri*, *Lastrea Filix-foemina*, and *Lastrea dilatata*, *Viola sylvatica*, Sweet Woodruff, Dog's Mercury, and *Brachypodium sylvaticum*. Near the Foss is a swamp controlled by *Equisetum maximum*, stems of which measured three to four and a half feet in height. The beautiful *Epipactis latifolia*, Water Figwort, and *Equisetum limosum* var. *fluviatile* were also noted. Near the Hermitage a large area of ground is controlled by the Monkshood, but that this is a garden escape is evidenced by other garden plants which still survive among it, chief of which is *Sedum grandiflorum*.

Mycology.—Mr. A. E. Peck writes:—The mycological representatives—Miss C. A. Cooper and myself, ably assisted by Mr. R. Fowler Jones as a collector of considerable experience, kept steadily at work and succeeded in compiling quite a respectable list of the Fungi of the district.

This list may be considered as supplemental to the one compiled when the Yorkshire Mycologists held their Fungus Foray at Egton Bridge in Sept.-Oct., 1902, the report of which by Mr. Chas. Crossland see *The Naturalist* for 1902, pages 355-365.

At present the woods contain many *Boleti* of the slimy capped section while the genera *Lactarius* and *Russula* are also very strongly represented. No *Lepiota* were seen and only a solitary tuft of *Agaricus* (*sylvaticus*). On the other hand, in the woods around Scarborough at present, species of *Lepiota* and *Agaricus* (=*Psalliota*) predominate.

Amanitopsis strangulata grows rather finely in the grounds of Sleights Hall.

Our specimens collected were placed, after examination outside upon a corner of the lawn for inspection and a con-

siderable amount of interest in them was taken by the assembled naturalists as well as by other visitors and residents. This interest was also extended to the portfolios of Fungus photographs exhibited by the writer.

With regard to parasitic fungi, one specimen only, of *Polyporus hirsutus* was observed, upon Ash, while neither the Birch polypore (*Polyporus betulinus*) nor *Armillaria mellea* were recorded. The Larch canker *Dasyscypha calycina* was seen but once, while the canker which is so ruinous to Ash was found to be particularly prevalent at Falling Force. Whether the last named is the result of fungus or insect attack, or a combination of both, has not yet been decided.

Our chief find undoubtedly was that of some very fine specimens of *Collybia radicata*, on a stump at Falling Force Wood. The pilei, which were of a rich brown colour—rugose and viscid, were 4 inches and 5 inches in diameter with stems of 10 inches and 11 inches in length. Their outstanding feature, however, was that the margins of the gills were found to be coloured like the pileus while gills of typical specimens are wholly white.

These specimens were sent to our veteran worker Mr. Charles Crossland of Halifax, who writes as follows :—' I have carefully examined the Agaric but cannot make it other than *Collybia radicata*. The colour of the pileus is certainly deeper than usual, and runs along the gill margins almost to the stem, but this may be so only in luxuriantly grown specimens (yet there is one not particularly luxuriant) ; the others are the finest I ever saw. I have carefully examined the gills and find the brown cast is due to a luxuriant outgrowth of hyphae, ending in clavate or subglobose tips, hyaline in a through light, but decidedly with a brown tint in bulk. You are quite right in saying that brown gill edges are not mentioned in the books as a character.'

Mr. A. Clarke, of Huddersfield who later saw the specimens says, ' *Collybia radicata* without a doubt—the edges of the gills being tinted is probably due to decomposition having set in—it is of no value as a character.'

I ought to explain that I noted the new feature immediately upon gathering the specimens and looked for symptoms of decay but had no hesitation in deciding that they were in *perfect* condition and one or more were probably not fully developed.

Thus is created an interesting position which one feels should be the subject of further investigation. Mr. Crossland kindly named several other specimens which were sent to him.

The list includes 132 species of which 66 do not occur in the 1902 list. Four are new to the County, viz.—*Lactarius retisporus* Mass., *Inocybe maritima* Fr., *I. margarispora* Berk. and *Boletus æstivalis* Fr.

Members of the Whitby Society turned up in good numbers. They rendered good service as collectors and one noted with satisfaction their special interest in Mycology.

Ithyphallus impudicus.
* *Bovista nigrescens.*
Scleroderma vulgare.
* *Amanita phalloides.*
* ,, *excelsa.*
,, *rubescens.*
* ,, *spissa.*
Amanitopsis vaginata.
* ,, *fulva.*
* ,, *strangulata.*
Tricholoma rutilans.
Clitocybe infundibuliformis.
,, *laccata.*
Collybia radicata.
* ,, *maculata.*
,, *confluens.*
* ,, *tenacella.*
,, *dryophila.*
* *Mycena rubro-marginata.*
,, *galericulata.*
* ,, *ammoniaca.*
,, *sanguinolenta.*
Omphalia fibula.
,, ,, var. *Swartzii.*
* ,, *caespitosa.*
* *Hygrophorus conicus.*
,, *chlorophanus.*
,, *psittacinus.*
,, *unguinosus.*
,, *ceraceus.*
* *Lactarius turpis.*
,, *pyrogalus.*
* ,, *acris.*
,, *piperatus.*
,, *quietus.*
* ,, *theiogalus.*
* ,, *vietus.*
* ,, *rufus.*
†* ,, *retisporus.*
* *Lactarius serifluus.*
* ,, *subdulcis.*
Russula nigricans.
* ,, *semicrema.*
* ,, *chloroides.*
* ,, *olivascens.*
* ,, *furcata.*
* ,, *purpurea.*
* ,, *lepida.*
* ,, *xerampelina.*
* ,, *cyanoxantha.*
* ,, *foetens.*
* ,, *emetica.*
,, *ochroleuca.*
* *Cantharellus cibarius.*
Marasmius peronatus.
Marasmius oreades.
* ,, *ramealis.*
,, *candidus.*
,, *rotula.*
,, *androsaceus.*
,, *Hudsoni.*
* *Pluteus cervinus.*
* ,, *salicinus.*
Entoloma jubatum.
,, *sericeum.*
* ,, *pulvereum.*
Clitopilus prunulus.
* *Leptonia lampropoda.*
* *Pholiota erebia.*
†* *Inocybe maritima.*
* ,, *flocculosa.*
* ,, *asterospora.*
* ,, *hiulca.*
†* ,, *margarispora.*
* ,, *scabella.*
Galera hypnorum.
* *Cortinarius* (*Myx*) *elatior.*
* ,, (*Hydroc*) *duracinus.*
,, (*Hydroc*) *acutus.*
Paxillus involutus.
Psalliota arvensis.
,, *campestris.*
* ,, *sylvatica.*
Stropharia stercoraria.
,, *semiglobata.*
Hypholoma fasciculare.
,, *velutinum.*
Psilocybe semilanceata.
,, *cernua.*
,, *spadicea.*
,, *foenisecii.*
* *Coprinus fimetarius* var. *cinereus.*
Panaeolus campanulatus.
Psathyrella atomata.
Boletus elegans.
* ,, *flavidus.*
,, *chrysenteron.*
* ,, *subtomentosus.*
* ,, *pachypus.*
* ,, *edulis.*
†* ,, *aestivalis.*
* ,, *luridus.*
* ,, *erythropus.*
,, *scaber.*
* *Polyporus brumalis.*
,, *squamosus.*
* ,, *hispidus.*
Polystictus versicolor.
Poria vaporaria.
* *Poria vulgaris.*

**Merulius corium.*
Hydnum repandum.
** Thelephora laciniata.*
Stereum hirsutum.
** Peniophora incarnata.*
Clavaria cristata.
,, fusiformis.
,, cinerea.
** Calocera viscosa.*
** Exidia glandulosa.*
Tremella mesenterica.
** Dacryomyces stillatus.*
Nectria cinnabarina.
Hypomyces chrysospermus.
** Hypoxylon fuscum.*
** Mollisia cinerea.*
Chlorosplenium aeruginosum.
Sphaerospora asperior.
Dasyscypha calycina.
,, virginea.
** Leotia lubrica.*
Rhytisma acerinum.

* Signifies new to the 1902 list.
† ,, ,, ,, Yorkshire.

Lepidoptera.—Mr. T. A. Lofthouse writes:—While the district visited from its varied character seemed a likely one for lepidoptera, the weather conditions prevailing during the visit proved altogether unsuitable for working for insects with any hope of success. The best insect taken was a single specimen of *Cerostoma sequella*, a very beautiful tinea, taken off the trunk of a sycamore tree, a tree with which this insect is almost always associated.

Most of the insects enumerated on the list occurred only in odd specimens, excepting *Cemiostoma laburnella* which occurred in fair numbers about laburnums in the garden of Sleights Hall. There were also a few *Plutella cruciferarum*, the 'pest' of the season about.

Pieris brassicæ
P. rapæ.
P. napi.
Epinephele janira.
Polyommatus phlæas.
Orgyia antiqua. Larvae, Glaisdale.
Acronycta menyanthidis ,,
Noctua baja.
Tryphæna pronuba.
T. janthina.
Abraxas grossulariata
Larentia didymata.
Camptogramma bilineata.
Cidaria fulvata.
C. immanata.
Scoparia ambigualis.
Scopula olivalis.
Crambus tristellus.
C. culmellus.
Peronea caledoniana.
Teras contaminana.
Argyrotoxa conwayana.
Grapholitha penkleriana.
G. nævana.
Symæthis oxyacanthella.
Tinea tupetzella.
Plutella cruciferarum.
Cerostoma sequella.
C. costella.
Harpipteryx xylostella.
Chelaria hübnerella.
Œcophora fuscescens.
Argyresthia ephippella.
A. nitidella.
A. albistria.
Cemiostoma spartifoliella.
C. laburnella.

Mr. M. L. Thompson reports meeting with the following beetles in Arncliffe Wood, viz:—

Megasternum bolitophagum Marsh.
Homalota analis Grav.
Homalota fungi Grav.
Sipalia ruficollis Er.
Hypocyptus læviusculus Man.
Tachyporus chrysomelinus L.
Tachinus rufipes De G.
Bolitobius pygmæus F.
Quedius molochinus Grav.
Ocypus brunnipes F.
Othius myrmecophilus Kus.
Stenus impressus Germ.

Stenus brunnipes Steph.
Oxytelus tetracasinatus Block.
Lesteva punctata Er.
Adalia obliterata L.
Meligethes æneus F.
Coninomus nodifer West.
Atomaria atricapilla Steph.
Typhæa fumata L.
Chrysomela staphylea L.
Phædon tumidulus Germ.
Crepidodera transversa Marsh.
Rhinosimus planirostris L.
Apion nigritavse.
Apion virens Hbst.
Otiorhynchus picipes F.
Strophosomus coryli F.
Phyllobius argentatus L.
Orchestes fagi L.

Geology.—Mr. J. J. Burton writes:—The selection of the Glaisdale District for the August Bank Holiday excursion was not because of any special geological features, nevertheless the area visited was full of interest to students of solid geology and fluvial and glacial action.

The little river Esk, dammed back by an invasion of the North Sea ice sheet, cut its way sometimes through the drift and sometimes through the solid Lias rocks during and after the period of ice recession, leaving a picturesque valley and several fine gorges. The high moorlands have been deeply indented by short lateral valleys, bare on the top except for moor flora, but the sides often clothed with luxuriant woods. On these steep slopes there are numerous exposures, and alum shale workings, as well as sandstone quarries, have artificially added to their number, although much is hidden beneath drift and talus.

During the three days' excursion the Upper Lias was well seen in the cliffs bordering the Esk between Egton and Glaisdale ; also at Sleights and at Falling Force. The Dogger was noted near Glaisdale, but was more closely examined in the ravine of Littlebeck, where appearances indicated its composition as a calcareous sandstone with iron in some proportion.

At Glaisdale there is a very singular narrow ridge of land running up from the river to the high ground, caused by the Glaisdale beck flowing into the Esk at a point where the latter stream makes a sharp curve, and the two streams form a very acute angle. On the sides of the winding cart track up this ridge the succession beds from the Lias through the Estuarines up to the Ellerbeck bed were fully exposed, and gave a good opportunity for close examination. The ridge ends on a plateau, on which are a series of shallow saucer-like pits 12 to 15 feet in diameter, in close succession, and probably over 200 in number, but owing to the covering of bracken, brambles and gorse, the number was not easy to estimate. The origin of these pits has been the cause of much speculation. The old ordnance survey gave them as a British village or settlement. A more critical generation threw doubts upon this belief of their age and purpose, and with dogmatic certainty assured us that they were merely Bell pits used for working ironstone. Similar pits, but differing entirely in arrangement, are found plentifully

in different parts of Cleveland. If these happen to be above any of the many thin seams of ironstone they have been promptly called ironstone workings. If they are not immediately above an ironstone bed, but above the jet shale, they were put down as jet workings.

Those at Glaisdale are above the Ellerbeck bed of poor ironstone and we have therefore been assured that they are ironstone workings, but the last ordnance map cautiously calls them simply ' Pits.'

The winning of ironstone and the manufacture of iron in however crude a fashion implies intelligence in the workmen. Why did any intelligent men pursue the laborious process of sinking pits from which to drive horizontal galleries with all the trouble of disposing of the débris when with infinitely less labour they could have worked the outcrop—a richer quality of stone—and by throwing the baring down the slope have won the stone in much greater quantity ?

In another part of Cleveland where there are hundreds of similar pits extending over several miles, designated of old as a ' British settlement ' but more recently ' Jet workings ' and ' Ironstone workings,' the writer was in a position to put the matter to proof and had a large number of them carefully dug out. In only one solitary instance did they penetrate into the jet shale and then only in a well-like shaft for 6 or 7 feet, and the seam of ironstone below was untouched. Abundance of charcoal, burnt sandstones, some 12th and 13th century pottery and other material of no particular importance was discovered, but nothing to show for what purpose they were originally used. I will merely add that most of them are on plateaus or terraces in defensible positions with a good outlook.

A visit was paid to the Hole of Horcum—an enormous depression in the Middle Oolite, passing over on the way some exposures of the Lower Oolite and an outcrop of the Cleveland Whin Dyke. The hardness of this rock as compared with its surroundings was well seen in the way in which it had resisted denudation and formed a ridge known as the Whinstone Ridge.

In and about the Hole of Horcum the Calcareous Grit, Oxford Clay and Kellaways rock are well exposed, but a deluge of rain prevented the members from making a very close investigation.

Boulders of Grey Limestone were seen in the stream above Falling Force, as well as a fine piece of well-rounded water-worn Shap granite, and a big block of the latter was also noted on Sneaton Moor. Erratics from the Cheviot district were common.

All the beds worked were remarkably unfossiliferous.

In Memoriam.

ALFRED JOHN JUKES-BROWNE, F.R.S., F.G.S.
1851—1914.

Northern geologists have long been familiar with the name of A. J. Jukes-Browne, whose careful work among the Cretaceous rocks is so well-known. Though a voluminous writer and a good correspondent, Jukes-Browne was rarely seen in the field, as he possessed only a partial use of his limbs, notwithstanding which he continued his work as a geological surveyor for twenty years after he was unable to walk.

He was born near Wolverhampton, his mother being a sister of J. Beete Jukes, the distinguished geologist, and as soon as he became of age, young Browne added the name of Jukes to his own.

Jukes-Browne's most important work was in connection with his studies of the zones of the English chalk, following the broad lines first laid down by Barrois. He was the author of many papers on this subject in the geological journals; his well-known volumes on 'The Cretaceous Rocks of Britain,' published by the Geological Survey, being a masterly summary of the subject.

Among his earlier contributions were some important papers on the glacial beds of Lincolnshire and East Anglia. These first put the present writer into communication with him, and he still possesses piles of foolscap copies of papers lent by Jukes-Browne for the purpose.

Besides the work already referred to, Jukes-Browne wrote a number of the smaller Geological Survey Memoirs, and papers innumerable; the *Geological Magazine* alone accounting for over a hundred between 1871 and 1914.

Of general text books, he was the author of 'A Students' Handbook of Physical Geology,' and a 'Handbook of Stratigraphical Geology,' each of which reached two editions; a 'Handbook of Historical Geology,' and 'The Building of the British Isles,' which last was perhaps the best known of his contributions, and reached a third edition in 1911.

He retired from the Geological Survey in 1902, and went to Torquay, where he resided till his death on August 14th.

T. S.

URIAH BAIRSTOW.
1847—1914.

Early in September occured the death of Uriah Bairstow, of Halifax, who was exceedingly well-known to Yorkshire naturalists, probably all of whom will be surprised to learn that he had reached his 68th year. Recently he had been suffering

from heart trouble, with which he was confined to his house for four months prior to his death.

It was always a pleasure to meet Mr. Bairstow. He was invariably exceedingly cheerful—most happy with his wit, and was no sooner in one's company than his joyfulness and light-heartedness became infectious, and an excursion always proved brighter if he was with the party.

He had a good all-round knowledge of scientific work, and was especially interested in botany, though chemistry, astronomy, etc., shared his attention. He was a valuable member of the Halifax Scientific Society, and frequently in earlier years, gave lectures to its members; and conducted excursions. With Messrs. C. Crossland, J. W. Sutcliff, and a few others, he commenced about 28 years ago the systematic study of the flowering plants of the Halifax area. Their joint efforts eventually led to the building up of a flora in all its branches, of the parish of Halifax, under the guidance of Messrs. W. B. Crump, M.A., and C. Crossland, by means of the 'Halifax Naturalist,' the organ of the Halifax Scientific Society.

Among other contributions to the Journal were 'Local Land Movements,' 'Haugh Shaw and Shaw Syke,' 'A Fungus Foray in Luddenden Dean,' and 'In the Footsteps of Oliver Heywood,' etc. He had a special pleasure in attending both the local and the Yorkshire Naturalists' Union fungus forays.

Mr. Bairstow took an active interest in the municipal life of Halifax, and was one of the elective auditors of the borough since 1895. He was a prominent member of Square Congregational Church, and was one of the founders of the Halifax Sunday Lecture Society. He leaves a widow, and five children, to whom we offer our real sympathy in their loss.—T. S.

Logging. By **Ralph Clement Bryant.** Chapman & Hall, 1913, pp., xviii. and 590, 15s. net. This text book by the professor of Lumbering at the Yale University, deals with the principles and methods of logging in the United States. The original forested area in the States is estimated to have covered 850,000,000 acres and contained about 5,200,000,000 feet of timber. It comprised four broad types, which are illustrated in a sketch map, viz.:—Northern, Central, Southern, Rocky Mountain and Pacific slope. The present forest area is 550,000,000 acres or about 65% of the original area. The work, written primarily for forestry students, is intended to fill a gap in the now extensive literature on forestry. It deals with the movement of timber from the stump to the manufacturing plant and describes in considerable detail the various methods of transport by land and water, and especially with the construction of logging railways. Chapters also deal with the protection of forest property from fire and wind; forest labour; camps and camp hygiene. Of the minor industries dealt with are interesting accounts of (1) Turpentine Orcharding and a comparison of box and cup systems and (2) Harvesting Tan-bark. In an appendix of 76 pages are given a copious bibliography, a glossary of logging terms, log rules, etc. The work is well and clearly printed and illustrated by 133 figures, many of which are from photographs.

FLOWERING PLANTS.

A Yorkshire Locality for *Habenaria albida*.—I have recently paid a visit to the locality for the White Mountain Orchis (*Habenaria albida*) near Hardcastle Crags, and much regret to record that this habitat for the plant is almost completely destroyed by quarrying and tipping in connection with the construction of a mountain tramway.—J. FIRTH, Liverpool.

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BIRDS.

Albino Blackbirds at Bishop Monkton.—A friend had reported to me that three albino blackbirds had been reared in one nest this year, near Bishop Monkton. Two of them were caught, one of which I recently examined, and found it an absolutely pure albino. It is a male bird and already sings fairly well.—A. HAIGH LUMBY.

Barn Owls in Morley.—A pair of Barn Owls has this year nested in the false roof of one of the gables of St. Peter's Church, Morley, entering at a louvre window. They brought off three young, one of which was strong enough on the wing to look after itself. The other two were found in the Churchyard unable to rise, so the Vicar, the Rev. F. Sykes, with kindly intentions, placed them in a box, and fastened it in a tree where the parents often spent the day, intending to liberate them when a little stronger; but much to his disgust, some one removed them without his knowledge or consent.—JASPER ATKINSON.

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Impurities of Agricultural Seeds. By **S. T. Parkinson, B.Sc.**, and **G. Smith, B.Sc.** Headley Bros., pp. 105. 3s. net. N.D. The writers of this little book, who are botanists at the Agricultural College at Wye, tell us they are not seed specialists, but have been induced to issue the work because the specialists have not done so. There is a need for such a book, beyond the range of agriculturalists, and we welcome this attempt. A hundred and fifty weed 'seeds' are described and illustrated by 150 photographs from actual specimens. They show clearly the characteristics of the 'seeds,' and will prove a great help in their identification. The introductory chapters are clearly written, and deal with such topics as the harm done by weeds; introduction of new weeds; a national seed testing station; state legislation; seeds from foreign countries; weed seeds common in samples; testing and identification. A key is given but the student is advised to 'construct a key for himself.' As the authors ask for 'information on any errors' we may say that we have seldom seen so small a book with so large a number of misprints, especially in the scientific names of plants, e.g., errors occur on nearly every page from 27 to 34 and 40 to 61, while in the index (which by the way, is unusually complete), they occur on every page. There is even an error in the correction note on page 4, and the definition of 'cypsela,' to which this note refers, is inaccurate, apparently due to a confusion between cypsela and caryopsis. Figure 63 shows a fruit case and seed of *Galium Aparine*, both magnified 10 diameters, yet the fruit case is much smaller than the seed, though in the text we are informed that the seed is 'only slightly smaller than the fruit.'

NEWS FROM THE MAGAZINES, etc.

No. 12 of Volume 13 of the *Museums Journal* contains an account of the new galleries at the British Museum.

The Report of the *Castle Museum Committee of Norwich* for 1913 contains an illustration of the new gallery, as well as of the Nepal Tiger presented to the Museum by the King.

The Thirty-sixth Annual Report of the Art Museum of *Nottingham* contains a record of the various additions made during the year. Among them are quite a number of interesting bygones.

Mr. Charles Madeley's Presidential Address to the Members of the Museums Association on 'What is the true theory of a Municipal Museum' is printed in *The Museums Journal* for August; there is also an account of the Swansea Conference.

As Publication 2212 of the Smithsonian Institution, Prof. Dr. C. Keller of Zurich has a paper on the 'Derivation of the European Domestic Animals,' which is translated from *Verhandlungen des VIII. Internationalen Zoologen-Kongresses zu Gras.*

The 65th Annual Report of the *Ipswich Museum*, etc., contains particulars of several cases of birds added to the collection, and also a number of important specimens under the head of 'Palethnology,' apparently a new science, which seems to be receiving some attention in the Ipswich district.

Mr. H. W. Ford-Lindsay records a New British Bird (Rüppell's Warbler), in *British Birds* for September, two specimens being seen in the flesh on May 6th. Guess where? Sussex? Correct! The same journal contains a valuable report on the Land-rail enquiry, by H. G. Alexander.

The Tokyo Zoological Society still continues to issue its valuable *Annotationes Zoologicae Japonenses*, parts III. and IV. of Vol. VII. of which have recently been published. Among the articles we notice papers on 'Gregarines,' 'Ascidians,' 'Synaptidae,' 'Coleoptera,' 'Isopoda,' and 'Protozoa.' Many of the papers are in English.

The Entomologist's Record informs us that according to an American scientific publication, ants near a shooting range have collected stray shot and particles of granite with which to build their mounds, and that over 50 pounds of shot have been collected from the mounds. We should surmise that with this particular kind of ant there aren't any antennae!

Mr. T. H. Nelson writes on 'Destruction of Grouse in a Storm in Yorkshire,' in *British Birds* for September. Lest any of our readers should think that the note might have been sent to *The Naturalist*, we may state, in fairness to Mr. Nelson, that it was; but as it was also sent to our contemporary, and we felt that most workers would find it wherever published, the London journal has had the honour.

The *Lord Derby Natural History Museum, Liverpool*, has issued a Handbook and Guide to the British Birds, which is illustrated by twelve plates of the more interesting groups in that well-known collection. It contains 69 pages and is sold at the low price of 6d. Judging by the illustrations, many of the groups are remarkably lifelike. We are permitted to reproduce the illustration of the Golden Eagle group (see plate XXVI.).

We have received the 25th Annual Report of the *Belfast Museum and Art Gallery* (Publication 43), which is increased to foolscap size. Why this sudden enlargement it is difficult to understand, as there is nothing in the report that would not appear in the octavo publications already issued by this museum. Possibly it is to 'go one better' than the Reports of the National Museum of Wales, which are quarto. It will, of course, be impossible to bind this report with the other publications. It includes many records of Irish Antiquities, etc., recently secured.

Golden Eagles. (See page 328).

NOTES AND COMMENTS.

PRESENTATION TO MR. C. CROSSLAND.

At the recent meeting of the Yorkshire Mycological Committee at Sandsend, the members took the opportunity of making a presentation to their secretary, Mr. Charles Crossland, by way of practically acknowledging his twenty-one years' connection with the committee as secretary. The gift consisted of a beautiful silver salver, bearing the following inscription: 'Presented to Mr. Charles Crossland by the members of the Mycological Committee of the Yorkshire Naturalists' Union, in recognition of his long services as secretary and recorder, October, 1914.' The presentation came as a surprise to the recipient. Mr. Crossland has always been held in the highest esteem, not only by the mycological, but by every other branch of this widely-known natural history society. The presentation was made by Mr. George Massee, V.M.H., F.L.S., etc., of the Royal Botanical Gardens, Kew, and was suitably acknowledged. Mr. Massee has been Chairman of the Committee since 1899.

MUSEUMS AND NATIONAL SERVICE.

In the Museums Journal for October, Dr. Bather writes on 'Museums and National Service,' in which he demonstrates the practical value of museums to the nation, even in war time. He concludes, 'had we been unable to discover in our museums anything of direct economic or practical value, we should still find them of service to the community in so far as they emphasise the importance of those facts and principles which form the ultimate base of our technical crafts, or in so far as they withdraw our attention from the dust of the world to those objects and ideals of perennial loveliness which are the lodestar of our lesser arts. In time of stern crisis and distressful thoughts, it is well that museums should offer a place of calm retreat wherein men may be reminded of the steadfast and increasing purpose that runs through the ages, or where they may refresh their hearts and renew their strength in contemplation of that heritage of beauty which it is now the privilege of each one of us to defend.'

SYNONYMY.

In some notes on the Synonymy of Boisduval's N. American species of Lycaenidae, appearing in *The Entomologist's Record* for September, we learn that *Epidemia zeroë* Bdv., becomes a synonym of *mariposa* Reak. Owing to a peculiar error this name had become interchanged with *nivalis* Bdv., although the original description is perfectly clear regarding both species. With regard to *Epidemia nivalis* Bdv., Boisduval's name becomes valid for the species heretofore known as *zercë*, with

ianthe Edw., as a synonym. This latter form is slightly better marked on the underside than the typical *nivalis*, but individuals vary in this respect. *Epidemia halloides* Bdv., is a common species and widespread ; *castro* Reak., is apparently correctly listed as a synonym. We are also informed that another species *Phaedrotes piasus* Bdv., has been completely misidentified and placed as the Californian form of *ladon* Cram. (*pseudargiolus* B. and Le C.). In reality the name applies to the same species as that which has been known as *sagittigera* Feld., and has priority over this name. We hope this is all quite clear !

THE MALTON MUSEUM.

We understand that Sir Walter Strickland, who has always taken a keen interest in the Malton Naturalists' Society, has purchased some property in Yorkersgate, Malton, with the object of converting it into a suitable museum for the Society's collections as soon as the necessary alterations can be made. It is hoped then that the Society's museum and library will be better housed, and possibly a lecture room will also be provided.

YORKSHIRE GEOLOGISTS.

The Yorkshire Geological Society has just issued part 1 of volume 19 of its proceedings, which is not so bulky as usual. It contains Mr. Alfred Harker's presidential address on ' Some Remarks on Geology in relation to the Exact Sciences, with an Excursus on Geological Time ' ; ' The Analysis of Ilkley Spa Water,' by Mr. B. A. Burrell ; Dr. Wheelton Hind describes a new Cephalopod from Derbyshire, under the name *Temnocheilus derbiensis*, and the same writer gives ' Palæontological Notes on the Millstone Grit Beds between Masham and Great Whernside.' Mr. W. S. Bisat describes ' The Millstone Grit Sequence between Masham and Great Whernside.' There are brief secretarial reports for the years 1912 and 1913. Altogether the report has a strong ' Carboniferous ' flavour.

RAVENSER.

We have recently received a pamphlet on ' Ravenser, and the Rise of the De la Pole Family, of Hull.' It is by the Borough Librarian of Beverley. We quote the first paragraph : ' So long ago that all authentic records are lost the fishermen of Grimsby, looking across the waste of heavy waters that surged round the familiar promontory we call Spurn, beheld a strange sight. Like the rounded back of some ocean monster risen to breathe, where had been nothing but water there appeared the glistering surface of sand and rock. It was the birth of a town—destined for a century or more to exert an influence over the affairs of the kingdom—the product of hidden forces that for ages had been accumulating rock and gravel and which now, coming to fruition, showed above the surface.'

THE RIPON CITY MUSEUM.

It is pleasant to record that during the present year the people of Ripon have obtained their permanent museum, through the generosity of Miss Darnbrough, who has not only presented to the city the Thorp Prebend House, an early seventeenth century building, but a substantial gift in cash. The collections formerly in the possession of Ripon Scientific Society, which have been stored for some time, are now on exhibition, and an effort is being made to give the collections a distinctly local character.

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BIRDS.

Manx Shearwater at Halifax.—A Manx Shearwater was picked up at Heptonstall, near Hebden Bridge, about September 20th, shortly after some strong westerly winds had been blowing, and was presented to the Halifax Museum. I believe this is the first record for the Parish of Halifax.—W. R. VERITY, Halifax.

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FISHES.

Large Yorkshire Fresh-Water Fish.—*Common Trout.*—A specimen weighing 7 lbs. 5 ozs, measuring 25½ inches long and 15 inches in girth was captured below the railway bridge at Malton on May 25th. *Grayling.*—One weighing 2½ lbs. and another 3 lbs. 4 ozs. were caught in the Derwent at Ganton, on March 1st.—R. FORTUNE.

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DIPTERA.

***Acletoxenus formosus* Leow. in Yorkshire—an Addition to the County List of Diptera.**—On the 29th July last I was collecting Diptera in a desultory fashion in a garden at Burley-in-Wharfedale, when my attention was drawn to a tiny species flying actively about among some bushes of 'flowering currant' and lilac. For its size it was unusually conspicuous owing to the bright yellow colour of its scutellum, which almost seemed to sparkle as the little creature darted about. Upon capturing a couple of specimens, I found them to be the males of *Acletoxenus formosus*, Loew, a rare species which has only hitherto been recorded from two localities in Britain, viz., Cambridge and Lyndhurst (in the New Forest). Its capture, therefore, in Yorkshire this summer, forms an interesting addition to our county list. The species has been well described by Collin in the *Entomologist's Monthly Magazine* for 1902 (pp. 1-3), where an excellent coloured figure will be found.—PERCY H. GRIMSHAW, Royal Scottish Museum, Edinburgh.

THE NESTING SEASON AT SPURN.

R. FORTUNE, F.Z.S.

This year we have had the services of the best watcher we have had so far. He was a practical man, who had a great interest in the birds, and has furnished me with a detailed list of the nests observed by him, and the results obtained from each nest.

He complains that the Crows are a great nuisance, numbers of them frequenting the district and doing a good deal of damage during the breeding season.

The first Tern's nest was observed on May 19th, and contained 3 eggs; only one nest was seen on this date. Altogether 89 nests of the Lesser Tern were marked by him during the season; 72 of which were in the neighbourhood of the Beacon, 16 on the Point, and 1 on the Bents. The birds have evidently changed their quarters again somewhat, as the proportions were not so marked last season, far more birds nesting on the point. Probably a few nests would escape the watcher's observation. It may be interesting to note that 8 nests contained only 1 egg, 53 nests contained 2 eggs, and 23 nests contained 3 eggs. Most of the nests marked, hatched off safely. 72 were known to have done so, 2 are known definitely to have been lost, and the fate of the other 15 are uncertain, probably the majority of them were failures. The general result is however, highly satisfactory.

Seventy nests of the Ringed Plover were also noted. 5 of these contained 1 egg only, 17 had 2 eggs, 14 had 3 eggs, and 34 contained the normal clutches of 4 eggs. Of course in many of the smaller clutches it is quite possible that some of the eggs had been removed by some agency. Ring Plovers' nests are more scattered than those of the Terns, but the numbers are reversed, the greater being on the Point. There were 29 nests on the Point, 21 at the Beacon, 9 on the Bents and 11 on the Humber side. Of these 49 are known to have hatched off safely, 1 was lost, and the fate of the remaining 20 is uncertain. These numbers do not of course represent the whole of the nests, as a number would no doubt hatch off before the arrival of the watcher.

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A party of naturalists recently visited the Scilly Islands, and on one of the lonely and uninhabited islands, found the humerus of a large bird, which seemed to be a puzzle. It was carefully compared with a large collection of bird bones in a well-known Yorkshire Museum, and could not be matched there. Hopes ran high. It was, therefore, sent to the South Kensington Museum, where it was pronounced to be the humerus of a domestic Turkey—doubtless a Christmas relic from a transatlantic liner.

Naturalist.

OLIGOTROPHUS VENTRICOLUS, RÜBS. A NEW YORKSHIRE GALL-MIDGE.

PERCY H. GRIMSHAW, F.R.S.E., F.E.S.

DURING an investigation of the purple heath grass (*Molinia cærulea*) on the Slaithwaite moors near Huddersfield, the Rev. T. A. Jefferies noticed the common occurrence of gall-like swellings on the leaf bases of this grass, and on examining the swellings he found each to contain several small larvae. These were submitted to Mr. E. G. Bayford who, however, was unfamiliar with the species. In the hopes of breeding out the fly specimens were kept under observation in the Biological Laboratory at Huddersfield, and others by Mr. Bayford from material sent him from the same locality; both were successful and specimens were then submitted to me for identification on the 13th of June last.

I was at once suspicious that the insect might prove to be the interesting Gall-Midge known as *Oligotrophus ventricolus* Rübs., which was added to the British list of diptera only two years ago by Mr. F. W. Edwards (5) from specimens obtained at Oldham in Lancashire. Upon the receipt of more material a few days later, I was enabled to confirm my suspicions, and now have pleasure in submitting a number of details regarding the insect which may be of interest to future workers. Although the discovery constitutes a new county record, yet the distance between Oldham and the Slaithwaite Moors, as the crow flies, is only a matter of about 10 miles. Since the grass is, I believe, a fairly common one, it would be interesting to ascertain to what extent it is infested with this gall in the area surrounding these two towns, and also whether the insect occurs beyond this area.* Mr. Jefferies is, I understand, preparing an account of the grass and the malformations, so that in the present article I shall confine myself strictly to the fly itself in its various stages.

Oligotrophus ventricolus as a perfect insect was first named and described by Rübsaamen in 1899 (2), although four years previously he had recorded and described the larva and gall produced by it (1). It was briefly referred to by Kieffer in 1900 (3), figured by him the same year (4), and lastly described by Edwards in 1912 (5). These are all the references to the species that I have been able to trace, and as most of them are in works not of easy access, I have thought it worth while

* The galls were found in great abundance in 1913-14, over a wide area of the Pennines, and appear to be common where Molinia occurs. Miss C. E. Wetherall, who had seen Mr. Jefferies' specimens, found the galls on plants she examined at Sutton Park, near Birmingham, in August this year.—T. W. W.

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to describe briefly and to make a few drawings of the insect in its various stages. Nowhere can I find any allusion to what is perhaps the most prominent feature in the male sex, namely the *lines of beautiful light golden hairs running along the thorax* as

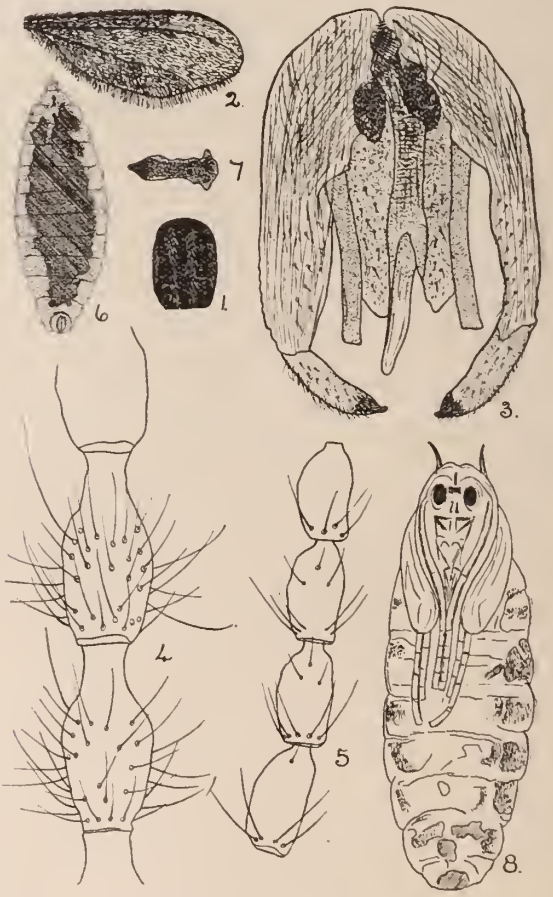

Fig. 1. Thorax of male, seen from above, × 20.
,, 2. Wing of male, × 10.
,, 3. Genitalia of male, × 95.
,, 4. Flagellar joints of antenna of male, × 200.
,, 5. Flagellar joints of antenna of female, × 200.
,, 6. Larva, ventral surface, × 10.
,, 7. Anchor-process of larva, × 90.
,, 8. Pupa, ventral surface, × 14.

described below. These hairs become easily rubbed off, and hence I am forced to the conclusion that the specimens I have

had the good fortune to examine are the only ones that have been seen in really perfect condition.

The full-grown larva (fig. 6) is 3.5 millimetres in length, of a creamy colour with yellowish-brown stomach. It is of the usual elongated ovate shape, pointed at the anterior extremity, with a very distinct reddish-brown 'anchor-process' (fig. 7). On the segment behind that bearing the anchor-process is a tiny chitinous plate of the same reddish-brown colour, and of an irregularly triangular shape. This structure, on the 4th segment, is said by Rübsaamen to distinguish this species from all other known *Cecidomyiidae*. He also describes it as lying beneath the skin and of a lighter colour than the anchor-process, but I am unable to confirm either of these points. The colour of this small plate appears to me quite as dark as that of the anchor-process. The shape of the latter is shown in figure 7, which I venture to think is a more accurate representation than the drawing by Rübsaamen. The tip of the process is decidedly darker in tint than the rest, while the opposite end is by no means symmetrical. Both the plates may be seen in their relative positions in figure 6. The whole surface of the larva appears under a low power to be shagreened, but under higher magnification the integument is shown to be beautifully reticulated.

The pupa is represented in figure 8. It is 4 millimetres in length and of a beautiful red colour, though considerably darker, even brownish, at the anterior end, where the wings, legs, and antennae of the future fly are plainly to be seen. At the sides of each segment of the abdomen are patches of tiny black scale-like hairs, these patches extending round the sides to well on to the dorsal surface.

The male fly is a very beautiful creature about 3 millimetres in length. The antennae are blackish brown, the joints bottle-shaped (see fig. 4) with several whorls of hairs on the swollen basal portion. Thorax shining black, with four conspicuous longitudinal stripes, each composed of several rows of beautiful light golden scale-like hairs (see fig 1), two of the stripes running along the centre of the dorsum for practically its whole length, the other two occupying the extreme edges of the dorsum, commencing a little posterior to the central ones and terminating about the root of each wing; scutellum and portion of dorsum immediately anterior to this blood-red. As mentioned by Rübsaamen, there is a blood-red stripe on each side of the thorax, running from the neck to the root of the wing. This is only conspicuous however, in life. Abdomen blackish-brown to black above, with pale yellowish hairs, on the sides and below blood-red, fading to light yellowish-brown after death. Wing (fig. 2) light or dusky brown, very conspicuously hairy, the hairs by reflected light appearing light

golden. Genitalia as in figure 3, very conspicuous, light yellowish-brown. Legs also light yellowish-brown.

The female fly may be briefly described as follows: length, 3.5 millimetres, antennal joints as in figure 5, the narrow portion not so long in proportion as in the male, the whorls of hairs not so numerous (the figure was drawn from a preparation in canada balsam, and, as most of the hairs were rubbed off, only serves to indicate the general shape of the joints); thorax entirely shining black, with no trace (in any of my specimens) of the golden hairs so conspicuous in the male sex; scutellum also quite black. Abdomen with black bands separated by conspicuous blood-red transverse lines which mark the edges of the segments, patches of black scales on the sides, opposite the black bands of the dorsal surface; ventral surface also banded with black, but the blood-red more conspicuous: ovipositor blood-red, fading to light yellowish-brown; wings somewhat paler and less densely haired than in the male.

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3. Kieffer, J. J., Suite a la Synopse des Cecidomyies d'Europe et d'Algerie, p. 12 (1900).
4. Kieffer, J. J., Ann. Soc. Ent. France, 1900, pl. 31, fig. 9.
5. Edwards, F. W., Entomologist's Monthly Magazine, 1912, pp. 136-137.

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We understand the Museum at Rochdale has been put under the wing of the Chief Librarian, Mr. R. J. Gordon.

The Annual Report of the *Warrington* Museum Committee for the year ending June 30th, 1914, is for the 66th year since the Museum's establishment. It contains particulars of several interesting additions, many being of local interest.

Filey to the front again. We give the following from a recent issue of the *Yorkshire Weekly Post*, without comment:—'CAPTURE OF 'AN EAGLE' BY A FILEY BOY AT SEA.—On Tuesday last, whilst one of the Filey boats engaged in the herring fishing, was out at sea, at a distance of about fifteen miles, the crew observed a large bird approaching, which after hovering a short time, alighted upon the masthead. One of the lads on board, noted for his previous daring, immediately commenced climbing the mast, thinking to secure a prize, but on the lad approaching it took wing. He had not descended far, however, before the bird returned to its previous position, apparently much exhausted. The plucky lad again sprang up the mast, and on reaching the top attempted to grasp the bird, but his majesty was not to be taken without a struggle, for he stuck his talons deep into his hand, making the blood to flow most freely. Scales (the lad's name) nothing daunted, clinging tightly to the mast with his legs, threw out the other hand, seized the eagle by the throat, and suceeded, after a little flapping of the wing and attempting to bite, in strangling him. He then tied him round his neck, and came down, a bloody victor, to the deck. The eagle is of a darkish brown colour, speckled with white, of beautiful plumage, but excessively lean, about two feet long, measuring from tip to tip of wing a little more than five feet.

YORKSHIRE NATURAL HISTORY 200 YEARS AGO.

(*Continued from page 314*).

3. *Leeds* also affords us several Waters of the medicinal Kind, which, for the Benefit they may afford to our Reader occasionally, we shall add, *viz.*

1. St. *Peter's* Spring, which is intensely cold, and hath proved very beneficial to such as are troubled with Rheumatick Pains, Weaknesses, Rickets, &c. for which Reason it is much frequented by those who were wont formerley to have Recourse to St. *Mongah's* Well abovesaid.

2. *Eye-bright* Well, which stands on a declining Ground, near the *Monks-pit*, carries its Virtues in its Name, being found a Sovereign against sore Eyes, as by long Experience the People have found.

3. The Spring at the Skirt of the *High Dam*, whose Water by the Powder of Galls will turn into a purple colour. It hath sometimes been drank medicinally with good Effect.

4. The Spaw on *Quarry-hill*, whose Virtues surpass all the Rest, and are too many particularly to be set down, being a *Panacea*; The Ducking-stool, or as the *Saxons* call it SCEALPING-STOLE, is near it.

4. Fire, as necessary an Element in those Climates as either of the former; and we may observe, that the farther North in this Kingdom a County is, the better it is provided with Fuel for Fire, and that in such an Abundance, as that the more southern Parts, and particularly *London*, is supplied therewith plentifully from thence. In this Riding there are three Sorts of Fuel for Fire, *viz.* Pit-coal, Wood and Turf; Pit-coal is the most plentiful and cheapest, the great Towns and Gentlemen's Houses being chiefly supplied with that, as also the Forges for Iron. The Mines for this Fuel must needs have been very great, and common antiently, if not still; since, as we have related above, there was in King *Hen.* VIII.'s Days, twenty-five Coal-mines within ten Miles of *Hassel-wood*. Wood is not so plentiful as antiently, though it is not wanted, but is only used upon better Occasions, because Coal is both more common and much cheaper. We do not find that there are so many and so large Woods proportionably in other Parts of this Riding, as there were in K. *Hen.* VIII.'s Days, within ten Miles of *Hasselwood*, as we had said above, *viz.* 275 several Woods, and some of them containing 500 Acres; and yet there may be sufficient for all necessary Uses for Building, Shipping, and Firing. Turf, as it is the most unwholesome, so nothing but Poverty and Necessity can oblige even the meaner Sort of People to use it for Firing. We do not find it dug any where

but in the boggy Part of the River Isle, called *Marshland*; and tho' the Villages thereabouts are pretty plentiful, and for them it may be of good Use; yet 'tis not likely that it can be carried up higher much into the Country, because Coal is so much better, and but a little dearer Firing.

The Natural History of this East Riding.

NATURE doth not seem to have been so kind and bountiful to this Part of this Shire, as to either of the two other Ridings, yet hath endowed it with such a Competency of Necessaries for Life, as may be, thro' their Industry, sufficient Encouragement for their Habitation, which is shewed, not only by other considerable Towns, as *Bridlington*, *Beverley*, *Headon* and *Patrington*, but chiefly by *Kingston* upon *Hull*, a Merchandizing Town, equalling *London* itself for Traffick, allowing for the Differences of Extent; which will, we hope, be more manifest by a particular Survey of the Elements, *viz.* the *Air*, *Earth*, *Water* and *Fire*.

1. The Air cannot, we conceive, be altogether free from some feculent Vapours, which make it something noxious, because it is encompassed on all the Eastern, and great Part of the Southern Side, by the Sea and the River *Humber*; but this Inconvenience is recompensed partly by the Fruitfulness of the Soil near the Sea, but more especially by the considerable Trade that is carried on by the Inhabitants of the Sea-coast at *Bridlington*, *Hornsey*, *Patrington* and *Hull*: And as to the other Parts of this Riding, which are remote from the Sea, the Hills raise the Villages and some Towns so high, that they seem to dwell in a more pure Air than the rest of the Riding near the Sea and River *Derwent*; for there are no considerable Waters in the Midland, where the Springs of the River *Hull*, and divers little Brooks, arise and disperse themselves into other Parts.

2. The Earth cannot be called Barren altogether, yet comes far short of the Fruitfulness of the Soil in the other Ridings, and most other Counties. The mountainous Part of this Riding, call'd *York wolds*, i.e. *Yorkshire hills*, which are barren, sandy and dry, uninhabited, and extending themselves a considerable Distance into the Wapentakes of *Bainton*, *Buckcrosse*, and *Dickerings*. At the Foot of these Woolds or Hills, near *Bugthorp* and *Leppington*, are found the Stone called *Astroites*. It is dug out of a certain blew Clay on the Banks of a small Rivulet, between *Bugthorp* and the Woolds; and Plenty of them are by the Rains washed into the Brook. The Matter of them is something like that of a Flint of a dark shining Politure, but much softer. It is thought by the

Naturalist,

Ingenious to calcine readily, and thereby make a stong Lime. They are all Fragments of one single Joint or more, from three to twenty-five ; and from those Joints proceed certain Wires, which make them resemble the *Equisetum*, or Horse-tail ; so that some skilful Naturalists make no Difficulty to admit them to be Rock-Plants. The Product of this Riding as to Corn, or Nourishing Cattle, is not much different from some Parts of the *West-Riding*, save that there are not so great Quantities of either ; and Sheep are the most plentiful of all Cattle ; which not being rich enough to fat, they are sold lean into other Counties, where there are Marshes to fat them, being of a large Size, and such as are usually spent at *London*. The Soil in and about the Woolds abounds with Chalk, Flints, Pyrites, &c. And their subterraneous Treasure is much increased by the Mines of Coal and Free-stone in divers places of this Riding, as *Ilkley*, *Rudston*, &c. which is all we observe concerning the Nature of the Soil in this Riding.

3. Waters, with which though this Riding is plentifully supplied, yet not with so many Rivers as the other two, but those it hath are of the first Magnitude, *viz.* the *Humber*, *Derwent*, *Hull* and *Foulnesse*, which three last empty themselves into the first, and so pass into the Sea. We shall begin with the

1. *Humber*, or the *Æstuary Abus*, by which Name it is expressed in *Ptolemy* ; but by the *Saxons*, with whom we join in the Name, it is called *Humber*, and from it all that Part of the Country which lay on the North side of it, was called in general, *Northumbria* or *Northumberland*. Both Names seem to be Derivatives from the *British* Word *Aber*, which signifies the Mouth of a River, and was perhaps given to this by Way of Excellence, because the *Urus* or *Ouse*, with all those Streams which fall into it, and many other considerable Rivers, discharge themselves into the Ocean by it. But yet, though the *Abus* and *Humber* pass generally for one and the same River, yet *Ptolemy's* ABOS seems to be a corrupt *Greek* Name of the River *Ouse*, rather than to have had its Original from the *British Aber*. It is plain however, from this Expression of *Ptolomey*, ABOU POT, EKBALAI, *i.e.* the Ejections or Emptyings of the River *Abus*, that he meant, that the River had that Name before it came to the Outlet. It is without Question the largest Æstuary, and the best stored with Fish, of any in those Parts. At every Tide it flows as the Sea does, and at the Ebb returns its own Waters, and those borrowed from the Ocean to it again, with such a great Force and Noise, as is affrighting to Strangers, and not without great Danger to Sailors and Passengers ; but being well known, is easily avoided. *Nekham* hath some ingenious Verses upon the Nature of this River, and its Name, which we think needless to add.

2. The *Derwent*, or *Derventio*, a noble Stream indeed,

rising in the Northern Part of this Riding, at a Village called *Lebberston*, a little way distant from the Sea-side, and passing all along the Western Borders of it, till it falls into the *Ouse* at *Barmby*, and so is carried into the *Humber*. In its Course it is replenished with Water all along by smaller Brooks, and affords not only a pleasant Water for constant Uses, but brings Plenty of Fish to the Doors of the Inhabitants of many Villages standing on the Banks of it, near the greatest Part of the Riding.

3. *Hull*, which rising in the Woolds, and being augmented in its Way by many little Brooks, passeth into the *Humber*, and gives Name of it to *Kingston*, situate on the Banks of it, and usually from thence called *Hull*. It is Navigable as far as *Beverley*, which is much enriched by it, the Townsmen there having drawn a Channel at their own Expense from the River to their Town. This River also abounds with Plenty of Fish, and is chiefly of Use to the more Inland Parts of this Riding.

4. *Foulnesse*, though it passeth for a River, yet is but a good large Brook, rising at a little Distance in the Country, *viz.* at *Godmanham*, and dividing its Stream a little above *Sand-holm*, falls into the *Humber*, at a double Mouth just at its Conjunction with the *Ouse*. We find nothing of a peculiar Nature of Excellency in it, and therefore shall now pass to other Waters of a more singular Nature, being some way preternatural or medicinal, *viz.*

1. The Rivers called *Vipseis*, which by *Walter de Hemingburgh* are said to flow every other Year from unknown Springs, and with a great and rapid Current run into the Sea at *Hornsey*. This Account of them is justified by *William Newbrigensis*, who being born at *Hornsey*, has thus spoken of them: These famous Waters, commonly called *Vipseys*, break out of the Earth at several Sources, not incessantly, but every other Year, and having made a strong Current, run through the lower Grounds into the Sea. When these are dried, it is a good Omen; for the Flowing of them is truly said to forebode the Misery of an approaching Famine. But we have a much better Account of them from the pious and judicious Mr. *Ray*, which, because it may be much better depended on, we shall subjoin. They are in these Parts called *Gipseys* (whether or no from the Corruption of *Vipseys* we shall not determine, though such Things are common) and break out in the Woolds or Downs of this County after great Rains, and spout up Water to a great Height. They do not come at set Times, every other Year, nor doth the Flowing of them portend (as *Newbrigensis* speaks) a future Famine infallibly, but accidentally it may happen so, because they never are seen, but only after great Gluts of Rain, and lasting wet Weather; and so do indeed foreshew a Famine sometimes, not as a divine Indication or Forewarning,

but by a natural Significancy, it being experimentally known that cold and wet Springs and Summers mar the Corn, and do almost constantly bring a Dearth in *England*, which a Drought never does.

If any be so curious as to enquire how a Glut of Rain can cause such a Springing up of Water? I answer where such Jets happen there are great subterraneous Basins, or Receptacles of Water, which have near them some narrow small Veins, reaching to the Surface of the Earth; and the Water in these Basins being much higher than the Places of Eruption, by its Weight forces the Veins to open and spout out from them to a great Height, as is evidently seen in the *Lacus Lugeus*, or the *Zirchnitzer-Sea*, where his Spouting up of Water happens every Year after the Autumnal Rains. Nor are these Eruptions peculiar to this County; for in *Kent*, near the rising of the River *Kennet*, there break out Waters in the Manner of a Land Flood, out of certain Stones like Rocks, standing up high in the open Fields. The *Kentish* People call them Nailbourns, and think them Fore-runners of a Dearth, as they may possibly be, for the Reason above alleged about the *Vipseys*.

2. The *Marr-water* in the Way from *Bridlington* to *Hornsey*. This Water is pretty deep, and always fresh; it is about a Mile and Half long, and Half a Mile broad. It is well stored with the best Pikes, Pearches, and Eels; whether it was caused at first by some Earthquake, with a flux of water following it, or some other way, it is hard to say; but the People say there have been found old Trees floating upon it, and decayed Nuts found upon the Shore; as also upon the Sea-cliffs, near *Hornsey*, where was also, not long since found a Vein of Wood, as black as if it had been burnt, which it is probable was occasioned by its lying long in the Water.

3. A Kind of Spaw, about a Mile from *Beverley*, to the East, in a Pasture call'd *Swinemoor*, belonging to that Town. The People say it cannot, by the Taste be judged to come from any Mineral, yet, being taken inwardly, it is a great Drier, and being washed with outwardly, it kills all Scorbutick Scurf, and all Sorts of Scabs, and very much helps the Kings Evil.

4. Fire and Fuel, for it is plentiful here, as in the other Ridings, being Pit-Coal chiefly, yet they want not Wood for more sweet Firing, and Turf; but the Coal being cheap, little else is used, so well hath Nature provided for these Northern Parts.

The Natural History of this [North] Riding.

THIS Riding being very hilly, and extending itself farther Inland than the other two, may equally at least contend with them for Plenty and Conveniency; and if so, being taken

with them, may make good the Character, which we find given of the Whole put together, *viz.* That it is the best Shire of *England*, not because 'tis the biggest (as Good is sometimes taken for Great, as a good Blow, good Piece, &c.) but in the properest Acceptation, as it affords more Necessaries of Life, and more profitable Commodities than any other singly; being so placed by Nature, that it enjoys almost all the Benefits, that either Sea or Land can bestow. But this will more fully appear by considering it by these Parts. 1. The Air. 2. Earth. 3. Water. 4. Fire.

1. The Air indeed in this Riding is colder than in the other two, being elevated more to the cold Clime, the Northern Pole; but that rather betters the Air, than renders it unwholesome; for Cold not only clarifies the Air, but hinders noxious Fogs from rising; yea, and moreover strengthens Human Bodies by closing the pores, which Heat opens, and by that Means much impairs the Stength. Hence it is the most Robust Men come out of the North, and the Northern Nations yield the most hardy Soldiers. There is one rare *Phænomenon* relating to the Air here, which we can't but mention, though we have not Judgment enough to solve it. There is a certain Piece of Ground near *Whitby* in this Riding, over which when the Wild-Geese fly in Winter to the unfrozen Lakes and Rivers in the more Southern Parts in great Flocks, they suddenly fall down to the Ground, to the great Amazement of all Beholders. We should not have taken notice of this Accident, had we not been well assured of the truth of it from several Credible Persons. What Cause to impute this to, we can't tell; we have not Faith enough to believe, that the Holy Abbess *Hilda* hath by her Prayers entailed such a Quality upon this Ground, as destroys those Fowls, if they so much as fly over. Others, who are less inclined to Superstition, attribute it to some occult Quality in the Ground, to which the Wild-Geese have a Natural Antipathy, as 'tis said Wolves have to the *Scylla-Roots*; for that there are such sudden Tendencies and Aversions, as Sympathies and Antipathies is allow'd on all Hands; and 'tis from such an Antipathy that the Wild-Geese fall in these Lands; but it seems to us more probable, that this hurtful Quality should be in the Air itself, and that at a great distance from the Earth; for Wild-Geese fly high; and did not the noxious Vapour greatly spread itself, it is probable it could not affect them; but we assert nothing positively; let the more skilful in Nature's Work judge, and rectify any Mistake. What if the Air should be so pure here, that it is not fit for breathing, and so the Wild-Geese faint and fall.

2. Earth, or Soil, is not much different from that of the other Ridings, but being more hilly must be something more barren;

yet in the Vallies, and by the Rivers are found Plenty of good Meadowing and Grass, and not a little by the Industry of the Inhabitants is used for Tillage on the Sides of the Mountains, and in some level Grounds ; so that Cattle for Plough and Pail have sufficient Support for the Profit of the People. But beside these Sorts of Beasts, this County is particularly famous for the Breed of Horses for the Saddle, Coach, and other better Uses. It is commonly thought the best Race of *English* Horses are bred here ; the Gentry delighting in Horsemanship, and Peasants in the Gain arising from them ; They keep them usually in stony Ground to harden their Hoofs. Nor are the Mountains themselves unprofitable, affording tolerable Pasturage for Sheep, which they sell lean into other Counties for fatting.

The Forest of *Galtres*, called in *Latin Calaterium Nemus*, is the most remarkable Product of Wood in this Riding. In some Places it is thick and shady, and in other flat, wet, and boggy. It did of old extend itself to the very Walls of *York*, as appears by a Perambulation made 28 *Edw.* I. but now it is much lessened, and Towns are built in it, *viz. Sullington*, *Sutton*, *Shypton*, &c. In the *Fœdera* there is a Patent bearing Date *June* 22, 1502. made at *Westminster*, appointing *Henry*, the Son of K. *Hen.* VII. who was then lately (by the Death of his elder Brother Prince *Arthur*) Prince of *Wales*, Warden of this Forest ; which shews it then to have been a Place of Note. But the Surface of the Earth yields less Profit than the inward Parts, which are full of a valuable Treasure of Metals, Minerals, &c. as,

1. Allum. 2. Jet. 3. Copparas. 4. Marble. 5. Pit-Coals, &c. 6. Kelp.

1. Allum, with which the Lands about *Gisburgh* abounds, as also other Places. It was first discovered here by the Sagacity of the learned Naturalist Sir *Thomas Chaloner*, by observing that the Leaves of the Trees hereabouts were of a more weak sort of Green, that the Soil was speckled with diverse Colours, and never froze, and in a pretty clear Night it shined and sparkled like Glass on the Road-side, which invited him to dig for it, and found it. It is a Mineral dug out of a Rock, of the Colour of Slate at first, but being burnt, it changeth to a more ruddy Colour, and then they steep it in Pits of Water, which they dig for it on purpose ; and when it hath lain as long as they think Convenient, they boil it, and clarifie it for Use, as we have it. The *Chaloners* and *Darcys* had anciently Allum-Works here, but they have been laid aside a good while, and the Allum-Trade is removed to *Whitby*, where there is Plenty of the Mine, and more conveniently had. These Works are carried on by the Duke of *Buckingham*, and *Normanby*, or his Agents, and are profitable to the Country,

as well in employing Multitudes of Labourers, and consuming great Quanities of Coal, as to the Undertakers in bringing them much Gain; for tho' Sr. *Paul Pindar*, who first farmed the Allum-Mines at *Gisborough*, paid Rents to the King 12500*l.* to Earl *Mulgrave* 1640*l.* and to Sir *William Penniman* 600*l.* and had besides in constant pay 800 Men by Sea and Land; yet he was a considerable Gainer, because there was scarce any other to be had; and the Price was 26*l. per* Tun. Now there are diverse Allum-Works in this County besides these mentioned, *viz.* at *Sands-end*, *Ashold*, *Slapywah* and *Dunsley*.

2. Jet, Geat, or Black-Amber, in *Latin Gagates*, which Name, though it is given to the Agate, is much different from it; indeed some take it to be the same, but through a great Mistake. It is found in this County in several Places by the Sea-side, growing in the Chinks and Clefts of the Rocks, which are filled up therewith. It is naturally of a reddish rusty Colour before it is polished, but after, it is really (as *Solinus* describes it) Diamond-like, black and shining. The rare Qualities of it Authors thus describe, which are worth our Notice,

———Præfulget nigro splendore Gagates
Inter Brittannos. Levis & lævissimus idem
Vicinas paleas trahit attritu calefactus,
Ardet aqua lotus, restinguitur unctus Olivo.

In *English* thus,

Black shining Jet stone, like a Gem, is found
Among the Britains *in their Rocky Ground.*
'Tis smooth and light, and being rubb'd to heat
Will draw like Amber Straws and Chaff of Wheat.
Sprinkled with Water, it will Fire take,
But Oil will quench it, and the Heat quite slake.

Solinus gives us these Qualities more fully in Prose. In *Britain* there is great store of *Gagates*, or Geate, a very fine Stone; if you would know the Colour, it is black and shining like a Jewel; if the Quality, it is exceeding light; if the Nature of it, it burns in Water, and is quenched with Oil; if the Virtue, it has an attractive Power, when it is heated with rubbing.

3. Copperas, which is extracted out of some of the Earth, that is digged out of the Allum-Mines; for in searching for the Allum-Earth, there arise Veins of Metals, and Soils of diverse Colours, especially those of Ocher and Murray, from which they extract Copperas, as well as Allum.

4. Marble, and diverse sorts of Stones of strange Shapes and Natures. Marble is hewed out of the Rocks near *Eggleston* in *Richmondshire*, where that mountainous and vast Tract always exposed to Wind and Weather begins. It is called

Stanemore by the Inhabitants, from its Ruggedness and Stoniness; it is altogether desolate and solitary, except one Inn in the middle of it, for the Entertainment of Travellers. Other Stones of extraordinary Shapes and Kinds, are, 1. Stony Serpents, or certain Stones resembling the Wreaths and Foldings of a Serpent; they are usually found in the Allum-Mines; and though some assert them to be the Frolicks of Nature, which she Forms for her Diversion; for one would believe that they had been Serpents really crusted over with Stone; and Fame ascribes them to the Power of *Hilda's* Prayers, who thereby converted real Serpents into Stone; yet Dr. *Nicholson*, an Ingenious and Judicious Naturalist affirms them to be the same with those called by our Moderns *Cornua Ammonis*,, and is of the Opinion that they are spiral Petrifications produced in the Earth by a fort of Fermentation peculiar to the Allum-Mines. 2. Round Stones, which one would think were Bullets cast by some artist for great Guns. They are found at the Bottom of the Rocks on the Shore at *Huntley-Nabb*; if you break them you find within them Stony-Serpents, wreathed up in Circles, but for the most part without Heads; they are exactly round. Upon the Shore near *Huntcliffe*, are found yellowish and reddish Stones, and some crusted over with a brinish Substance, which by their Smell and Taste resemble Copperas, Nitre and Brimstone; as also great store of *Pyrites* in Colour like Brass.

5. Pit-Coal, and other Mines, which the Hills of this Riding, especially in *Richmondshire*, afford in great Abundance, as Lead and Brass, as well as Coal. In a Charter of King *Edward* IV. there is Mention made of a Mine of Copper near the City of *Richmond*; but no Motives of Gain, which every where almost prevail, have yet been able to excite the Inhabitants to search for it; the Reason is conjectured to be the Difficulty of Carriage. In the Mountains here, are also found Stones resembling Sea-Cockles, Oyster-Shells, and the Figures of other Animals, which because they are never found single and dispersed, but in firm Rocks, and Beds of Limestone, may not improperly come under this Head of Mines. These the Miners call Run-Limestone, because they suppose these Figures to be produced by some extraordinary Heat, and quicker Fermentation than the rest of the Quarry. This some learned Men believe to be as rational an Account of these Preternatural Productions, as any hath hitherto been given. *Oroscus*, a Christian Historian, takes them to be certain Tokens of *Noah's* Universal Deluge, when the Sea being spread over the Earth, left those Heaps of Cockle and Oyster Shells behind it at the Reflux; but this being disallowed by our Naturalists, the former will be more probable.

6. Kelp, a Sort of Manure for Land, which the Husbandmen

all along the Shore about *Whitby*, are almost continually busy to make after this Manner. They gather the Sea-Wrack and lay it on Heaps, and when it is dry, they burn it ; while it is in burning they stir it to and fro with an Iron Rake ; and so it condenses and Cakes together in such a Body, as they call Kelp, which is also of use in making of Allum ; if they should not stir it, it would burn to Ashes as other Combustible Matter does.

3. Waters, of which the four great Rivers, which with the Rivulets and Brooks that empty themselves into them, supply this Riding with Plenty of Water, as well for Pleasure and Profit as Use, deserve the chief Place. They are, 1. The *Tees*. 2. The *Swale*. 3. The *Ure*. And, 4. *Derwent*, of which we shall briefly insist, *viz.*

1. The *Tees* rises in the Bishoprick of *Durham*, but having received the Rivulet of *Lune*, which rises in *Lune* Forest, and some other Brooks, becomes a Part of this Riding at *Rokeby* where the River *Grata* falls into it, and divides it from the Bishoprick, and after a considerable long Course, with many Windings falls into the *German* Ocean ; some noted Towns on the side of *Durham* stand upon it, but none on this, but *Yarum*, a small Market-Town. By it the Villages, which stand pretty thick upon its Banks, are plentifully supplied with Salmon, and Fish of diverse other Sorts.

2. The *Swale*, so called, say some, from its Swiftness, falls into the *Ure* with a great Leaping of Waters near *Myton* ; it rises out of the Western Mountains, scarce five Miles above the Head of the *Ure*, and runs to the Eastward. It was very Sacred among the *Saxons*, because when they were first converted to Christianity, there were baptized in it, in one Day, by *Paulinus*, Archbishop of *York*, to their great Joy, above Ten thousand Men, besides Women and Children. The Course of this River lies through a pretty broad Vale, which from thence is called *Swaldale*, which has Plenty of Grass, but wants Wood. From thence it holds on its Course to *Richmond*, the Chief City of the Tract or Shire called *Richmondshire* ; after which there is in it such a great Fall of Water, as deserves the Name of a Cataract, because the Waters rather rush than run there, being dashed and broken by the Rocks in its Way. A little Village standing near it there, called *Catarrick* may seem to take its Name from it. This River also affords great Variety of Fish to the Inhabitants near it.

3. The *Ure*, which hath its Rise out of the Western Mountains, not far from the Original of the *Swale*, and first runs through the middle of the Vale, called *Wentsdale*, which is plentifully stocked with Cattle, and in some Places affords Lead : A little Distance from its Spring, while the Current is yet but small, it is increased by the Rivulet *Baint*, from the

South, which comes from the Pool *Semur* with a strange Murmer. Sr. *Christopher Medcalfe*, the Chief of the Family of that Name, (which was so numerous in his Time, that when he was the Sheriff of this Shire, he met the Judges with three hundred Horse with Men of his Family and Name) brought Crey-Fish from the South parts of *England* to stock it with them, which have wonderfully increased in it since. This River at a Place called *Att-scar*, running between two Rocks with great Violence, makes an hideous Roaring, and so passes by *Bolton*. Besides Crey-fish above mentioned, this River hath diverse other Kinds, which are no small Convenience to the Inhabitants, who are some of them Fishermen.

4. The *Derwent*, which is the Boundary to this and the East Riding, hath a Right to be taken Notice of here, as well as there. It gave Name to a City in the *Roman* Times, which stood on the Banks of it, called therefore Derventio, where a Company of *Derventienses* under the General of *Britain* was quartered. *Auldby* is thought to stand in the same Place by our Antiquaries. *Battle-Bridge* lies over it at *Standford*. This River is so plentifully filled with water by the small Brooks falling into it, that as oft as it is increased with Rains, it overflows the Banks, and lays all the neighbouring Meadows a-float: It runs with more Swiftness below *Babthorp*, than before, and was made Navigable by an Act of Parliament passed 1 *Anne*. It abounds with Fish, &c. To these it may not be improper to add the particular Benefit yielded to these Parts by the

5. Sea, which affords the Inhabitants an Abundance of Fish, as well for Food as Sale, but more especially Herrings, (called in Latin *Haleces Leiccomenidae &c., Chalcides.*) These Fish, which in the Time of our Ancestors swarmed only about *Norway*, do now in our Times by the Bounty of Divine Providence swim in great Shoals round our Coasts every Year. About Midsummer they leave the Main Sea, draw towards the Coast of *Scotland*, where they are catched and sold off, as being then at their best; from thence they pass to the *English* Coasts, and arriving about the middle of *August*, there is excellent Fishing for them, till *November*, from *Scarborough* to the *Thames* Mouth; afterwards they are carried by stormy Weather into the *British* Seas, where they are caught till *Christmas*, and then coasting *Ireland*, return into the Northern Ocean, and remain there till *June*, where having spawned and recruited their numbers, they begin the same Course again. The *Hollanders* and *Zealanders* have a great share in the Profit of these Fish; for having obtained leave for the Castle of *Scarborough* for Fishing, they apply themselves to it with that Assiduity and Diligence, that they make a greater Gain of it than the *English*.

Besides these common Kinds of Waters, there are others more remarkable, *viz.* 1. The Spaw-Well at *Scarborough*, about a Quarter of a Mile South of the Town: It is a very quick Spring, arising upright out of the Earth like a boiling Pot, near the Level of the Spring-Tides, with which it is often overflown. In the most Droughty Years it is never dry, but in an hour affords twenty-four Gallons of Water; for the Stones thro' which it flows contain more than twelve Gallons, and being empty'd every Morning, it will be full within half Hour. Its Virtue proceeds from a Participation of Vitriol, Iron, Allum, Nitre, and Salt: to the Sight it is transparent, inclining a little to a Sky Colour, and hath a pleasant acid Taste from the Vitriol, and an Inky Smell. The Waters, (which are much resorted to in the hot Months of Summer) being drank are purgative and diuretick, much of the Nature of the Waters of *Pyrmont* in *Germany*. They have wrought Strange and Wonderful Effects, and many Persons almost every Year find great Benefit and Advantage by them. There are no Walks, nor publick Diversions, as there are at the *Bath* and *Tunbridge*, but there are very good Accommodations for such as drink the Waters.

2. Baths, used frequently in the *Roman* Times by the Soldiers quartered in *England*; from whence a Town in this Riding was called *Lavatræ*, now *Bowes*. These Baths were anciently in frequent Use among the Soldiers, as well as all others, as well for Health, as Cleanliness; (for in those antient Times they were wont to wash every Day before they eat) and they were at one time built, both publickly and privately, at such a strange Rate, that that Man thought himself poor and mean, who had not the Walls of his Bath shining with great and costly Bosses. In them both Men and Women wash'd promiscuously, though that was often prohibited by the Laws of the Empire, and Synodical Decrees; but these Baths here are now not used. Near *New Malton* is a Well, whose Waters are supposed to have the same Virtues with those at *Scarborough*; but the Spring being weak affords but a small Quantity.

3. Mineral Waters are found upon *Ounsbery* Hill, or *Roseberry* Topping, where upon the very Top, out of a huge Rock, flows a Spring of Waters, which are an effectual Medicine for diseased Eyes.

4. *Rical*, a small River, which in its Course runs under Ground for above a Mile, unless in Times of Rain, when the Abundance of Water makes it change its Course and run above Ground, as in other Places it doth.

4. Fire, which in those Northern cold Climates is as necessary as Food, is by Nature as plentifully provided for in those Parts, and especially in this Riding, which being most North-

ward must be supposed to be the coldest ; for here are not only several large Forests, as *Pickering* Forest in the Wapentake of that Name, the Forest of *Galtres* in the Wapentake of *Bulmere*, *Swaledale* Forest in the Wapentake of *Hang-west*, *Applegarth* Forest in the Wapentake of *Gillingwest*, New Forest in the same Wapentake, and *Lune* Forest in the same Wapentake ; which may be thought almost sufficient to furnish the whole Riding with Wood for Firing, and yet this Riding hath the greatest Quantities of Pit coal of any of the other, so that Providence hath super-abundantly furnished the Inhabitants with a sufficient Antidote against the coldest Seasons.

Plants growing wild and plentiful in this County, but rarely, or not at all in most others, *viz.*

Allium montanum purpureum, Purple-flower'd mountain Garlick, on the Scars of the Mountains near *Settle*, in the West-Riding.

Alsine pusilla pulchro flore, Small fine mountain Chickweed ; with a milk white Flower ; in the Mountains about *Settle*, plentifully.

Bifolium minimum, or *Ophris minima*, The least Tway-Blade ; on the Heaths and Moors in many Places, as on *Blackamore* in the Way to *Gisborough*, &c.

Calceolus Mariæ, Lady's Slipper ; at the End of *Helkeswood* near *Ingleborough*.

Campanuala cymbalaria foliis, Tender Ivy-leaved Bell-Flower ; about *Sheffield*.

Cannabis flore amplo, Fair flower'd Nettle-hemp, in the Mountains and Cornfields in many Places of this County, plentifully.

Carum vulgare, Common Caraways ; in the Pastures about *Hull*.

Caryophylata purpurea, Purple Avens ; in the Hills and Brooks about *Settle*, &c.

Caryophillus minimus, Thrift or Sea Gilliflower ; in *Bleaberry-gill* at the Head of *Stockdale fields*, a little Distance from *Settle*.

Cerasus avium Racemosa, The wild cluster Cherry-tree, or Bird-cherry ; in the mountainous Parts of the West-Riding of this County.

Christophoriana, Herb *Christopher*, or Baneberries ; in *Haselwood* Woods, near Sir *Walter Vavasor's* Park-pale, and among the Shrubs by *Masham-cave*.

Cirsium Britannicum repens, The great *English* soft or gentle Thistle, otherwise called the melancholy Thistle ; in the Mountains about *Ingleborough*, &c.

Cochlearia Rotundifolia, Common round-leaved Scurvy-

grass; upon *Stanemore* near the *Spittle*, plentifully, upon *Penigent* and *Ingleborough* Hills.

Coniza foliis laciniatis, Jagged-leaved Fleabane Mullet; at the End of *Shirley* Pool, near *Rusby moor*, but at some Distance from it.

Erica baccifera nigra, Black-berried Heath, Crow-berries or Crake-berries; on the boggy Mountains and Moors plentifully in many Parts.

Fucus, or *Alga tinctoria*, Dyers Weed; it is often cast on the Shore near *Bridlington*.

Fungus piperatus succo lacteo, Pepper-Mushroom, with a milky Juice; in *Marton* Woods under *Pinno-moor* in *Craven*, plentifully found by Dr. *Lister*.

Geranium batrachioides montanum, Mountain Crowfoot Cranesbill; in the mountainous Meadows and Bushets in the West-Riding.

Geranium moschatum, Musket-cranes-bill, commonly called Musk; it grows commonly in *Craven*, as Dr. *Lister* tells us.

Gnaphalium montanum, Mountain Cudweed or Catsfoot; upon *Ingleborough* and other Hills in the West-Riding, and in *Scosby-Leas*, near *Doncaster*.

Helleborine foliis longis angustis acutis, Bastard Hellebore, with long narrow sharp-pointed Leaves; under *Brackenbrow* near *Ingleton*, and near *Ingleborough*.

Helleborine atro rubente flore, Bastard Hellebore, with a blackish Flower; on the Sides of the Mountains near *Malham*, four Miles from *Settle*, in the *Whern*.

Hieracium montanum Cichorei folio, Succory-leav'd Mountain-hawkweed; in the boggy Places of some Woods about *Burnley*.

Hordeum Polystichon, Winter or square Barley, in the North Parts called Big; it endures the Winter, and is therefore sown in the mountainous Parts of this County and all over the North, instead of the common Barley.

Lilium convallium, The Lilly of the Valley, or May-Lilly; on *Inglethorp* Hills, &c.

Lunaria Minor, Moon-wort; on the Tops of some Mountains near *Settle*, where it thrives plentifully, and is more large than in other Counties, where 'tis also found.

Lysimachia, or *Chamænerion latifolia*, Rose-bay, or Willow Herb; in the Meadows near *Sheffield*, and in divers other Places.

Lysimachia luteaflore globoso, Yellow Loose-strife with a globular Spike, or Tuft of Flowers; in the East-Riding, found by Mr. *Dodsworth*.

Muscus clavatus, Club-moss, or Woolfs-claw.

Muscus clavatus foliis cupressi, Cypress-moss.

Muscus terrestris Repens, Creeping Club-moss.

Muscus Abietiformis, Upright Fir-moss.

Muscus polyspermos, Seeding Mountain-moss.

All these Sorts of Moss are found on *Ingleborough* Hills; some lie about Springs and watery Places; and others are common to most of the Moors and Fells in the North.

Ornithigalum luteum, Yellow Star of *Bethlehem*; in the Northern Woods, by the *Tees* Side near *Greata-bridge* and *Brignal*.

Pentaphylloides fructicosa, Shrub-cinque-foil; on a Bank by the River *Tees* near *Thorp*, and below *Eggleston* Abbey, as also at *Mickleforce* in *Teesdale*.

Pentaphyllum parvum Hirsutum, Small rough Cinquefoil; in the Pastures about *Kippax*, a Village three Miles from *Pontefract*.

Pyrola vulgaris, Common Winter-green; near *Hallifax* in the Way to *Kighley*, and on the Moors near *Heptenstall*, in the Way to *Burnley*, plentifully.

Pyrola folio mucronato serrato, Sharp-pointed Winter-green with serrate Leaves; in *Haselwood* Woods, near Sir *Walter Vavasor's* Park.

Polygonatum flore odoro cum pediculis singularibus, Sweet smelling *Solomon*-Seal, with Flowers on single Foot-stalks; on the Cliffs near *Settle* and *Wharfe*.

Primula veris flore rubro, Birds-eye; in the mountainous Meadows about *Ingleborough*, and elsewhere in moist and watery Places.

Pyrola Alsines flore Europæa, Winter-green with Chick-weed Flowers; at the East-End of *Rumbles-mere* near *Helwick*.

Pyrola Alsines flore braseliania, Winter-green Chickweed of *Brasil*; near *Gisburgh* in *Cleveland*, as Mr. *Lawson* affirms.

Ranunculus globosus Aconiti folio, The Globe-flower, or Locker-gowlons, a Kind of Aconite or Woolfe-bane; in the mountainous Meadows plentifully.

Ribes vulgares fructu Rubro, Common red Currans; in the Woods in the Northern Parts of the County about *Greata-bridge*, and elsewhere.

Ribes alpinus dulcis, Sweet Mountain Currans; found in this County by Mr. *Dodsworth*.

Rhodia radix, or *Telephium Roseum*, Rosewort; on the Rocks on the North-side of *Ingleborough* Hill, plentifully.

Rosa silvestris pomifera major, The greater *English* Apple-Rose; in the mountainous Parts of this County it is very common.

Rosmarinum silvestre, Wild Rosemary, or marsh Holy Rose; on Mosses, and most other moorish Grounds.

Rubus saxatilis, The Stone-bramble, or Raspis; on the Sides of *Ingleborough* Hills, and other Hills in the West Riding.

Salix folio laureo odorato, Bay-leaved Sweet-Willows;

in the mountainous Parts of the West-Riding, by the Rivers and Brooks Sides.

Salix pumila montana folio rotundo, Round-leaved mountainous Dwarf-Willow; on the Rocks on the Top of *Ingleborough* Hill on the North-side, and on the *Whern* Side Hill over against it, near the subterraneous River.

Sedum alpinum ericoides cæruleum, Mountain Sengreen, with Heath-like Leaves, and large purple Flowers; on the uppermost Rocks on the North-side of *Ingleborough* Hill.

Sedum minus Alpinum luteum, Small yellow mountain Sengreen; on the Sides of *Ingleborough* Hill, about the Waters on the North-side.

Sedum alpinum trifido folio, Small mountain Sengreen, with jagged Leaves; on *Ingleborough* and other Hills, in the North Parts of the County.

Sedum purpureum pratense minus, Small marsh Sengreen; on the moist Rocks about *Ingleborough* Hill, in the Way to *Hoton* in *Ribbesdale*.

Sideritis arvensis latifolia hirsuta flore luteo, Broad-leav'd rough-field Ironwort, with a large Flower; about *Sheffield*, *Darfield*, &c. among the Corn.

Trachelium majus Belgarum, Gyant Throatwort; every where among the Mountains.

Thalictrum minus, The lesser Meadow-Rue; on the Rocks about *Malham* and *Wharfe*, very commonly and plentifully.

Thlaspi foliis Globulariæ, Treacle Mustard with Flowers like Woad; in the mountainous Pastures going from *Settle* to *Malham*, plentifully.

Thlaspi, vel potius Leucorum sive Lunaria vasculo sublongo intorto, The Lunar Violet with an oblong wreathen Cod; on the Sides of the Mountains of *Ingleborough* and *Hinkle-haugh*, in moist Places and where Waters spring up.

Vaccinia Nubis, Cloud-berries, Knotberries or Knoutberries; on *Hincle-haugh* near *Settle*, and on *Ingleborough* and *Pendle* Hills.

Valeriana Græca, Greek Valerian, called by the Vulgar The Ladder to Heaven, or *Jacob's* Ladder; in *Carleton beck*, where it falls into the River *Are*, but more plentifully about *Malham-Cove* in the Wood there, as also in *Cordil* or the *Whern*, where there comes out a great Stream of Water.

To which we shall add, though out of its Order,

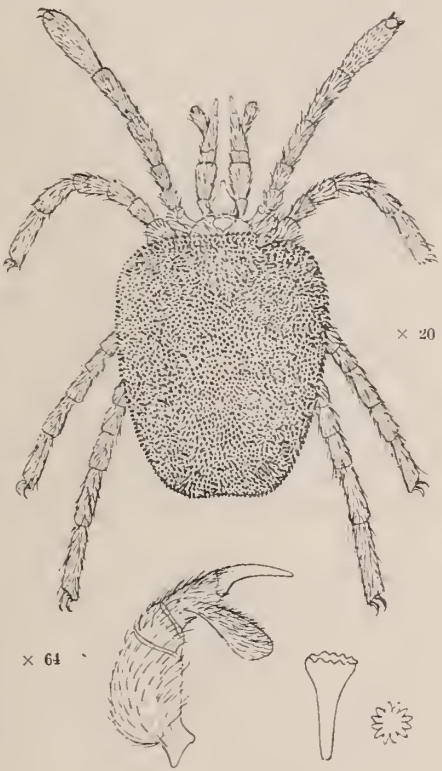
Glycyrrhiza vulgaris, Common Liquorice, which though not originally a Native of this County, yet being planted and much cultivated in large Gardens at *Pontefract*, for Sale, deserves a Place here; as also,

Serpentaria Anglica, English Serpentary or Snakeweed, a Sort of Bistort; it grows in shady moist Woods, and at the Foot of Hills in divers Places of this County.

TROMBIDIUM BUCCINATOR.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

In *The Naturalist* for November, 1911, page 380, I gave a figure and description of this mite from an old mounted specimen made by me many years ago. Recently I have had a specimen preserved in spirit sent to me, and Mr. Soar has kindly made a drawing of it before it was mounted, avoiding the distortion produced by pressure. It will be seen that in general shape it greatly resembles *Trombidium holosericeum*, * being rather square, and posteriorly slightly emarginate, not rounded. The eyes are petiolated, each having two ocelli. It is, however, a much smaller mite, and has none of the long silky hairs on the fore part of the dorsum seen on *holosericeum*. The back of this mite is covered with trumpet shaped hairs or papilla, the distal end of each enlarged, circular, and crenated (see enlarged figure) and not being very closely pressed together, they give the mite a very rough appearance, when seen under a rather low power. They also retain much of their beautiful colour, even after mounting in canada balsam. The crista cannot be well seen, so that I have not been able to obtain a figure of that organ.



Trombidium buccinator.

* See *The Naturalist* for September, 1908, page 333.

FIELD NOTES.

MARINE ZOOLOGY.

Marine Zoology at Blackhall Rocks, Durham.—During the recent holidays, I took the opportunity of visiting Blackhall Rocks, on the Durham coast. Taking advantage of a low tide, I brought away several large *Laminaria digitata* which I uprooted. Encircling the stem, was abundance of that fine zoophyte *Plumularia setacea*. On the fronds there was *Obelia geniculata* in plenty, while near the root was the usual coating of *Membranipora pilosa*. Among the roots I took a few worms (*Nereis diversicolor*). One Common Brittle Star, *Ophiothrix fragilis* was also present. Two kinds of crustacea were obtained from the Fucus. Hanging on to the Plumularia were numbers of Spectre Shrimps, *Caprella linearis*, and their movements over the zoophytes were most interesting. Several specimens of the spider-like *Nymphon gracilis* were taken among the roots of the Laminaria.

The overhanging rocks yielded plenty of fine sponges, e.g., *Halichondria panicea*, mostly green or yellowish red, and the simpler calcisponge *Grantia compressa*. *Alcyonium digitatum* was abundant, and I noticed that the polyps did not fully expand except in a strong current of water. The sea anemones, *Tealia crassicornis* and *Actinia mesembryanthemum* were common, but a fine colony of the large white Plumose Anemone *Actinoloba plumosa*, was a new sight to me. The rocks have few loose stones, but under most were quantities of *Chiton cinereus*. The commonest fish in the rock pools was *Gunnellus vulgaris*.—H. PRESTON, Middlesbrough.

The Viking Society continues to issue its valuable **Old-Lore Miscellany**, the latest parts issued being Nos. 49 and 50; the last being the index number. The publication contains a fund of valuable information relating to the most interesting part of North Britain.

Part 4 of the **Transactions of the Yorkshire Numismatic Society** (pp. 87-110, A. Brown & Sons, 1/-), contains 'Treasure Trove found in Sheffield,' by E. Howarth; 'An Unpublished Leeds Penny Token of the Seventeenth Century,' by T. Sheppard; 'Irish Regal Copper Coinage,' by T. Pickersgill; 'Coins in the York Museum' (illustrated by eight plates) by G. Benson; 'Numismatic Notes,' by the editor (Mr. Sheppard), and the Secretary's Report and Financial Statement.

From the Director of the Geological Survey we have received the **Summary of Progress of the Survey for 1913**, which contains a substantial account of the field work during the year, and also petrographical, chemical, palaeontographical and photographic work of the survey, with a list of additions to the museum. In England and Wales the work of the Survey seems to have been principally centred round Bedfordshire, Warwickshire, Staffordshire, and London; all this is carefully tabulated. There are three appendices, dealing with the Heswall boring; a boring for coal at Hemington, Somerset; and Additional Notes on the Geology of the Lothian Shale-field.

ORNITHOLOGICAL OBSERVATIONS AND REFLECTIONS IN SHETLAND.*

EDMUND SELOUS.

GOT here yesterday (Sept. 26th), and walked out along the coast to-day. There were no Red-Throated Divers either on the sea or on any loch that I passed, or flying inland. Shags were standing on the face of the precipice where any roughness or inequality of the surface had made a sufficient alcove, jutty or "coign of vantage" for them. Such places show darker against the general level, making patches upon it which the birds themselves resemble, though darker still. Thus, until the glasses reveal them, their presence might long be unsuspected, yet one must suppose that this protective effect of the birds' dark, though sheeny, plumage, in combination with the shadow thrown by it upon the rock, is fortuitous, unless, indeed, it has been gained (but against what adequate enemies?) in combination with a considerable amount of sexual adornment.† In watching the birds, thus perched, it is often difficult to distinguish shadow from substance, so that either there seem to be two figures, with a duplicate set of motions, or else—a more frequent and bizarre effect—the one seems double-headed.

Whilst some of these Shags thus cling to the sheer rock, others prefer a steep slope surmounting the cliff, with the grassy summit which crowns it. There they stand or squat—often within a foot of one another—but the latter attitude, though one might suppose it to be much more luxurious, is not so frequently adopted as the upright one. Beyond a quiet enjoyment of one another's society, as one must imagine, little of feeling or emotion is to be detected at these gatherings, but sometimes one bird will make a sudden little run at another, and then at a second, and, perhaps, third, driving them a foot or two from their places, and then desisting, as though he thought it incumbent upon him to assert himself a little, without any ulterior object—at least such, if it exists, is not discernable. It is only by chance, if at all, that any of the vacated places are taken by the demonstrating bird—one,

* The following notes were made during a stay in Shetland in 1911.

† This, however, is a class of combination which appears to me quite possible in Nature, and has not perhaps been sufficiently considered. One selective agency would put a limit to the brightness, and the other to the plainness of a bird's plumage at the point when either became less advantageous to it than the other. Thus two advantages might be gained, so that mistaking a Scarlet Flamingo for a sunset or a Swan for a white mist need not be decisive against sexual selection.

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indeed, can hardly be better than another on a uniform greensward—and no other obtainable advantage can be even conjectured. Since however, the feeling first suggested as a cause of these outbreaks is too human a one to be lightly allowed to a bird, to what are we to ascribe them? All rivalry of courtship has now long been over, but the mere presence of one bird close by another of the same sex, might, through association, call forth this deep-seated impulse, though felt in a mild and evanescent degree, and to this perhaps, such occasional disturbings of an otherwise complete harmony are to be attributed.

For the most part, the members of these little autumn assemblies either stand statuesquely still, or else preen, more or less assiduously, the feathers of the throat and breast. Every now and again, however, one of them will have a little outburst of wing-flapping and then remain with them spread and half-drooping for a short while, before folding them up again. This characteristic action of the Shag, as well as of the Common Cormorant, has often been remarked upon, and it seems to be generally assumed that the wings are held, thus extended, in order to dry them, which, indeed, it looks like. But why should a bird whose whole body is so constantly wetted, and from whose plumage the water must run at least as easily as 'from a duck's back,' be under the smallest necessity of doing this? Moreover whilst many birds that have only just come in from the water keep their wings closed, others fly down to it again immediately after shaking them, whilst none keep them spread for more than quite a short time. The action must be looked upon as a personal trait or trick in the Cormorant tribe, emotional probably in its initiative, and having no ulterior utilitarian object. What may have been its origin is difficult to say, but in ascending the wet, slippery rock, at a steep angle, these birds are often constrained to help themselves by spreading and waving the wings in just the way that they do, when at ease, before holding them open, and an action constantly performed, with a certain purpose, may become so accustomed as to be ready to leap out, as it were, upon any and every occasion, or upon no occasion at all. Any little emotional impulse will then give rise to it, such as the mild excitement probably arising in the bird's breast, as it determines to fly down from the cliff where it has been standing, into the sea. That which excitement, in general, produces, sexual excitement would probably, also, produce if the field were not entirely occupied by other and more specialised actions, as is perhaps the case here.

On the same grassy summit crowning the rocky sea-battlements where the Shags are congregated, there is also—a little beyond them—an assemblage of Gulls—for the most

part Herring Gulls—with, perhaps, some Lesser Black-backs among them. All at once, as by an impulse arising, simultaneously, in all of them, they rise into the air, toss and circle in a wild tumultary manner, over the mouth of the small rocky inlet immediately beneath them, uttering some wailing cries, and then, almost as quickly, disperse themselves, so that, in a few minutes, none is to be seen. There is no apparent object in this aerial dance above the waves, thus suddenly and spontaneously arising. It must have some emotional origin, beyond our human purview, and the emotion whatever it may be, animates each bird of the assembly—hitherto standing idly and dully—at the same instant of time. This is but a single instance out of many observed by me of what is one of the most interesting, as it is, perhaps, the most mysterious fact of bird life.

An alternate rising and sinking, the last ending in a swift circling sweep or two, is the principal characteristic of this curious outbreak which is like the performance of some sad sea rite—for always it is seawards that the birds sweep. Though light as air, and graceful as a bird's flight must be, yet the great cliffs, the tossing waves and wild sky, the greyness and desolateness of everything, in which the very grass seems to share, combine to give to this dance of the Sea Gulls, in these their northern Isles, a mournful, almost a heavy character. Their cries, that never, to the human ear, have the ring of gladness, sound, now, like the saddest of dirges, to which the waves and winds reply. But what is it in reality? What are the birds' real feelings, and why, in one moment, do they all feel the same, and all act alike? To these questions the present day field ornithologist can give no answer. 'Sunt *mysteria* rerum.'

(*To be continued*).

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In No. 66 N.S. of *The Lancashire and Cheshire Naturalist*, the Rev. S. G. Birks continues his notes on 'The Crossopterygian Fossil Fishes of this area' (in one place called 'Crossodterygian.') It is mainly a list of the specimens in the Manchester Museum, and contains such entries as '*M. hibberti*, L. 10111, Scale, Loc.: Unknown'; '*M.* (*hibberti* ?), L. 10118, Small Scale, Loc.: Unknown.' We have failed to detect any new matter in this further contribution.

Among many articles appearing in *The Essex Naturalist* (parts 10-12 of Vol. 17, for April-December, 1913) recently received, we notice: 'Sarsen, Basalt, and other Boulders in Essex,' by A. E. Salter; 'The Coast Flora of the Clacton District,' by F. Saxer; 'Mycetozoa Seen during the Cryptogamic Forays in Epping Forest, 1913,' by Miss Gulielma Lister; 'On the Occurrence of Rhaxella-Chert in Epping Forest Gravels,' by Percy G. Thompson; 'Notes on Essex Geology at the latter end of the Nineteenth Century and After,' by W. Whitaker; and 'Cultivation of Fuller's Teasel in Essex,' by Alfred W. Dennis.

MARINE BIOLOGY AT WHITBY.

Rev. F. H. WOODS, B.D.

Partly owing to the war, partly the cold, stormy weather, and still more, it must be confessed, to the general lack of interest taken in the subject, very few turned up turned up for the meeting of the Yorkshire Marine Biology Committee, September 19th-22nd. This, in conjunction with the fact that the tides were not suitable, except on Monday and Tuesday, accounts for the comparative smallness of the finds as compared with those at Filey, Robin Hood's Bay and Scarborough. Those made seem to point to the general conclusion that the fauna of the shore south of Whitby is nearly identical with that of Robin Hood's Bay. The most interesting finds were the hairy crab, *Pilumnus hirtellus*, found for the first time on the Yorkshire coast last year at Filey, and the little dark Chiton *Craspedochilus onyx*, found at Robin Hood's Bay in 1911. The list of the Polyzoa, Crustacea, etc., has been supplied by Dr. J. Irving. The full list is given below :—

Porifera.

Halichondria panicea.

Hydrozoa.

Obelia geniculata.
Sertularia pumila.

Actinozoa.

Actinia mesembryanthemum.
Tealia crassicornis.
Sagartia troglodytes.
Sagartia pura.
Alcyonium digitatum.

Polyzoa.

Scrupocellaria reptans.
Cellaria johnstoni.
Membranipora membranacea.
Flustra foliacea.
Lichenopora radiata (fragment in sand).

Echinodermata.

Solaster papposus.
Asterias rubens.
Cribella oculata.
Ophiura alba.
Echinus miliaris.

Annulata.

Harmothoë imbricata.
Lepidonotus squamatus.
Eulalia viridis.
Nereis cultrifera.
Nereis pelagica.
Audouina tentaculus.
Nicomache lumbricalis.
Scolecolepsis vulgaris.
Lagisca floccosa.
Pomatoceros triqueter.
Serpula vermicularis.
Spirorbis nautiloides.

Crustacea.

Balanus balanoides.
Mysis chamæleon.
Hippolyte varians.
Eupagurus bernhardus.
Galathea squamifera.
Carcinus mœnas.
Cancer pagurus.
Porcellana longicornis.
Pinnotheres pisum.
Pilumnus hirtellus.
Amphithoë littorina.
Gammarus marinus.
Amathilla sabina.
Idotea tricuspidata.

Pycnogonidæ.

Nymphon gracile.

Mollusca (Shelled).

* *Tonicella rubra.*
Tonicella marmorea (2 plates).
* *Craspedochilus onyx* (*asellus*).
* *Craspedochilus cinereus* (*marginatus*).
Acanthochites fascicularis.
Nucula nucleus.
† *Nuculana minuta* (*Leda caudata*).
* *Anomia ephippium.*
Anomia patelliformis.
* *Mytilus edulis.*

* *Volsella modiolus.*
Modiolaria marmorata.
†*Modiolaria discrepans* (*nigra*).
†*Modiolaria discors.*
†*Pecten varius.*
†*Pecten opercularis.*
Turtonia minuta.
Montacuta bidentata.
* *Kellia suborbicularis.*
Lasæa rubra.
Syndosmya nitida.
†*Syndosmya alba.*
†*Tellina tenuis.*
†*Tellina fabula.*
Macoma baltica.
†*Donax vittatus* (*anatinus*).
Mactra stultorum.
† *Venus gallina.*
* *Tapes pullastra.*
* *Tapes pullastra* v. *perforans.*
†*Cardium echinatum.*
†*Cardium fasciatum.*
†*Cardium edule.*
†*Gari* (*Psammobia*) *ferroensis.*
**Sphenia binghami.*
Cultellus pellucidus (a fragment only).
**Saxicava rugosa.*
**Saxicava arctica.*
Zirphæa crispata.
**Patella vulgata.*
* *Helcion pellucida.*
**Acmæa virginea.*
Eumargarita helicina.
**Gibbula cineraria.*
**Lacuna divaricata* (*vincta*).
Lacuna pallidula.
**Littorina obtusata.*
**Littorina rudis.*
Littorina rudis v. *saxatilis.*
**Littorina littorea.*
Rissoa parva.
**Rissoa parva* v. *interrupta.*
Rissoa inconspicua (?).
Alvania punctura.
**Onoba striata.*
Onoba striata v. *arctica.*
Setia obtusa (*soluta*).
**Cingula semistriata.*
Skenea planorbis.
† *Capulus hungaricus.*
Trivia (*Cypræa*) *europæa.*
Natica alderi.
† *Velutina lævigata.*
Odostomia unidentata.
Odostomia turrita.
Brachystomia rissoides.
Pyrgulina interstincta.
Spiralinella spiralis.
Buccinum undatum.
**Purpura lapillus.*
**Nassa incrassata.*
Bela turricula.
Clathurella linearis.
Tornatina truncatula.
Diaphana hyalina.
Philine punctata.
Limacina retroversa.

NUDIBRANCHIATA.

Archidoris tuberculata.
Lamellidoris aspera.
Lamellidoris bilamellata.
Adalaria proxima.
Polycera quadrilineata.

FISHES.

Lepidogaster montaguii.
Gunellus vulgaris.

NOTE.—An asterisk * prefixed to a name signifies that the animal was found in a living state; a dagger † that the shell was found in a very young state.

At a committee meeting it was decided to hold the meeting next year at Scarborough, with the special object of investigating the north shore.

The Committee desire to express their thanks to the local society of Whitby for their kind help and co-operation.

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Mr. C. Crossland favours us with a copy of his pamphlet on 'An 18th Century Halifax Naturalist: James Bolton.' From this we learn that Bolton published the first British Works devoted exclusively to Fungi and to Ferns. These were fully illustrated, and were favourably noticed in the 'Monthly Review,' London, 1788-89-92. He also published an illustrated work on British Song Birds. He drew, etched, and coloured all his own illustrations. The *Leeds Mercury* says of him at his death in 1799: 'Well known among the Naturalists as being the finest drawer and painter of flowers in the North of England.' The pamphlet contains extracts from original letters to his brother.

NEWS FROM THE MAGAZINES, etc.

Amongst the items in the October *Journal of Conchology* we notice, 'The Variation in the Radula of *H. helvetica*,' by A. E. Boycott.

The October *British Birds* has a strong Sussex flavour about it, the items including Rose-coloured Starlings in Sussex, Yellowshank in Sussex, and Spotted Crake in Sussex.

In the *Entomologist's Monthly Magazine* for October, is a note on *Chionotopus*, an unrecorded genus of Coleoptera. 'Owing to a curious mistake on the part of its author, Abeille de Perrin, the genus *Chionotopus* has been overlooked and is not found in any of the successive issues of the *Nomenclator Zoologicus*.'

The *Journal of the Board of Agriculture*, Vol. XXI., No. 6, contains a valuable paper on 'The Cultivation and Collection of Medicinal Plants in England.' The illustrations of this paper include Cutting English Belladonna, Harvesting English Dill (*Peucedanum*), Cultivated Aconite, a Field of Foxglove, Golden Seal (*Hydrastis*) shaded by Elms, Golden Seal under Lattice Shade, Picking Henbane Leaves, a Field of *Datura Metel*, and a Plantation of English Valerian.

In the *Museums Journal* recently issued, Mr. Deane, of Belfast, was said to have stated that 'museum head-ache' was caused through 'viewing a great number of objects.' Mr. Deane corrects this, and states that what he stated was that the complaint was 'prominently connected with straining the muscles of the eyes caused by superposing of reflected images in a different focal plane from that of the specimens.' We understand that beer has a somewhat similar effect.

The *Journal of the East Africa and Uganda Natural History Society*, for August, 1914, contains, among others, the following valuable notes:—'The African Brown-Bellied Kingfisher,' Dr. V. G. L. Van Someren; 'The Organic Cell,' Dr. E. Wynstone-Waters; 'Some Notes on Game Animals of Jubaland,' Mr. I. N. Dracopoli; 'Some Notes on Fishes in British East Africa and Uganda'; 'Two Rare East African Animals'; 'Three New African Weaver-Birds of the Genera *Estrilda* and *Granatina*.' There are several illustrations, including a coloured plate of the Brown-Bellied Kingfisher.

In *The Entomologist's Record* for September, Mr. T. A. Chapman, in replying to Mr. Bethune-Baker on the genus *Lycaenopsis*, says that 'he interprets me as meaning that if *haraldus* to which the generic name *Lycaenopsis* was given, be not congeneric with *argiolus*, then the generic name *Lycaenopsis* is to leave *haraldus* and attach to *argiolus*. If such a thesis commended itself to me, my intelligence must be so low, that my not seeing the joke is comprehensible.' Mr. G. T. Bethune-Baker says in 'Remarks on Dr. Verity's Reply to one of his Critics,' in the same number, 'I differ from the Doctor very decidedly, but that is all, and even as he, so am I entirely content to "leave it to a jury of authorities to give its verdict on."' The science of entomology seems to be an interesting one.

The Entomologist's Record for September contains an interesting series of 'Current Notes and Short Notices.' In this, reference is made to an article in a popular 'Weekly,' which occurs under the heading of 'Scientists Wanted.' In this it is stated: 'The evolution of pests is so rapid that it is difficult for mere humans to keep pace with it. Not so many years ago grease-banding was introduced to allay the ravages of the wingless Moth, a pest that moved up the trunks of trees in autumn to lay its eggs in the crevices of the wood. In its passage it was arrested by the grease-band, a kind of sticky flypaper, by which it was entrapped. Scientific observations in Kent go to prove that, in the short space of twenty years, this particular pest has actually grown wings, and so can circumscribe the grease-bands!' Truly, scientists are wanted.

Naturalist,

NOTES AND COMMENTS.

YORKSHIRE BY PEN AND PICTURE.

With the above title Messrs. A. Brown & Sons, Ltd., of Hull, have published an exceedingly well illustrated book of 216 pages, measuring 14½ inches by 10 inches, well bound, and with an artistic cover. It includes a brief description of the history, etc., of the principal places in the county, in connection with which the natural history and geological features have not been neglected. There are also many fine reproductions from photographs and old prints. It is sold at the extraordinarily low price of 1s., possibly due to the number of advertisements, of which there are many. Unfortunately the volume does not appear to be dated. As the letterpress is edited by Mr. T. Sheppard, we are not in a position to offer any adverse criticism.

INVESTIGATION OF YORKSHIRE RIVERS.

A circular has neen issued by the Hon. Secretary of the Yorkshire Geological Society, suggesting that Yorkshire geologists should scientifically investigate our Yorkshire rivers. It is pointed out that 'the main lines of the work would be as follows: The various river basins would be defined, and one or more selected for a complete study. Or it may be advisable to call for volunteers from our members and all others interested, such as waterworks engineers, to investigate a number of the most accessible rivers. For example, the Calder may be undertaken by members residing in Mirfield, Wakefield, etc., and these would collect particulars of rainfall, variation of volume with respect to rainfall, variation of velocity with volume, formation and movement of gravel and sandbanks, erosion, dissolved and suspended matter.'

AEROLITE IN LANCASHIRE.

At the recent meeting of the Manchester Literary and Philosophical Society Mr. C. W. Jenkins exhibited and described an aerolite which fell at Upholland, near Wigan, on October 13th. 'Soon after its approach a violent explosion was heard throughout Lancashire, Cheshire and the surrounding counties. The result of the explosion is evident from the parts which were fractured before its entry into the earth. It is the largest 'find' in England for 120 years. A stone of 3½ lbs. fell at Middlesbrough in 1881, and a fall of iron, weighing 7¾ lbs., occurred in Shropshire in 1876. The weight of the two pieces exhibited was 28 lbs. 13 oz., and there is evidence that some 2 lbs. or so is missing. The constituents are mainly basic silicates, with iron and nickel.' We notice there is a record of the fall in *The Lancashire and Cheshire Naturalist* for October. It is there stated 'Unfortunately the meteor was removed and trace of it appears to have been lost.' It has evidently been found again.

THE ORIGIN OF THE YORKSHIRE LAKES.*

Prof. P. F. KENDALL, M.Sc., F.G.S.,

Though the four lakes in Yorkshire — Semerwater, Malham Tarn, Hornsea Mere, and Gormire—all owe their origin to the events of the Ice Age, all were essentially different in the mode of their formation. With regard to the pretty little lake of Semerwater, which lies in an arm of Wensleydale: in the Ice Age much of Yorkshire was buried beneath a great extension of ice, which extended from a centre about Howgill Fells. Some of this ice passed into the Ribble, but a great deal travelled eastward over Hawes into the Ure. This Ure glacier extended down the valley and encountered the great glacier occupying the Vale of York, to which it became tributary. During the decline of the Ice Age the Vale of York glacier continued in existence long after the tributary glaciers had dwindled. As a consequence Wensleydale was blocked at its mouth, and there were certain evidences that it formed a lake of great size with its water-level at a height of 1,000 feet above the sea. The local glacier ice carried such enormous quantities of morainic material that it eventually obstructed the narrow valley of the River Bain and impounded permanently, as Lake Semerwater, a portion of this great Wensleydale lake, though the rest of the waters were liberated by the removal of the Vale of York glacier.

Malham Tarn marked another phase of the ice. Glaciers came down from the heights of Fountain Fell toward the south, and the edge found a temporary halting-place on the high plateau above Malham Cove. There a ridge of glacial moraine was laid down, and within this, when the ice melted, was impounded a shallow sheet of water. The Tarn had been artificially extended, but it was originally enclosed at the outer edge by a dam of moraine, so that it lay within the line of the old moraine.

Hornsea Mere, in Holderness, lay outside the final moraine of the North Sea ice, but within a tract the normal drainage of which was disturbed by several morainic lines formed by the ice when it pushed inland from the coast. One such line of moraine lay at Roos, another ran through Kelsey Hill and Burstwick, and a third was marked by the low hills of rock debris on the Holderness coast.

Gormire had a different origin. When the Vale of York was occupied by a glacier twenty miles wide, the drainage being obstructed, the adjacent valleys of Cleveland were occupied by lakelets, which drained from one to another and cut channels

* Abstract of address delivered at the Hull meeting of the Geological Section of the Yorkshire Naturalists' Union, on Nov. 7th.

in the spurs of the hills. The spur on which Gormire was situated was deeply notched with several such channels. The top of the hill was, however, occupied by the hard though jointed Corallian rock, underlain by clay beds. Such a structure promoted landslips, for the water penetrated the joints of the rocks and was forced under pressure through cracks in the clays. A landslip, which was recorded by John Wesley in his 'Diary,' had obstructed the ends of one of the old drainage channels, and caused Gormire to accumulate as a lake.

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SOME FUNGI OF THE SEA-SHORE.*

Sir H. C. HAWLEY, Bart,

SHORE fungi may be divided into two classes, the one only directly or indirectly affected by the proximity of the sea, the other purely marine. The first seems to include few peculiar or specialised species compared with the accompanying phanerogamic flora. For instance, apart from such species as *Psilocybe ammophila*, *Geopyxis ammophila* and the 'scented' stinkhorn, most of the species to be found on a sand-dune are invading pasture species. There is an abundant saprophytic flora on all decaying vegetation on any exposed coast-line. The richest mycologic flora perhaps will be in the moist hollows.

The second consists of quite a number of species, mostly belonging to widely spread genera of the Pyrenomycetes, which seem to have invaded the sea in relatively recent times. They occur mostly on sea-weeds and include many interesting forms.

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We regret to notice the announcement of the death of Lieut-Col. Fishwick, of Rochdale, the Lancashire antiquary, in his 79th year.

The 'conductors' of our esteemed contemporary, *The Annals and Magazine of Natural History*, are getting drowsy. On p. 360 of the October number we had the astounding statement 'Male.—Identical with female.' We suppress the name and sex of the writer from feelings of delicacy, but we do think elementary English ought to be taught in our schools.

At a recent meeting of the *Lancashire and Cheshire Entomological Society* a fine lot of varieties of *Abraxas grossulariata* was exhibited from Huddersfield, which included a grand series of var. *nigrosparsata*, and one remarkable specimen having the left side wings black with a few marginal streaks on the hindwing, while the wings on the right side were typical. Mr. W. Mansbridge showed a long bred series of *Aplecta nebulosa*, the progeny of Delamere parents; these included the local type form, var. *robsoni* and a scarce leaden grey variation, dark *Polia chi* from Hebden Bridge, and *Odontopera bidentata* var. *nigra* from wild larvæ beaten on Simonswood Moss, in which locality, although of rare occurrence, this form seems to be increasing.

* Abstract of paper read at Sandsend, Oct. 6th, 1914.

THE DEVELOPMENT OF THE BASIDIA IN TREMELLA AND DACRYOMYCES.*

HAROLD WAGER, F.R.S.

THE basidium of *Tremella* is spherical and becomes filled with dense protoplasm. In the very young stages two nuclei are present. These fuse together to form the single basidium nucleus, which increases very much in size and becomes very prominent in the later stages. This nucleus divides transversely; a wall then appears between the daughter nuclei, dividing the basidium logitudinally into two cells. Each of the two daughter nuclei undergoes a further division, with accompanying cell division, so that the basidium is now divided into four cells. From the apex of each cell a sterigma is produced, the apex of which swells up to form a spore, into which the cell nucleus passes. In the first division of the nucleus eight chromosomes are found. These separate into two groups of four each. In the division of the two daughter nuclei only four chromosomes appear, and these divide by fusion into two groups of four each. The somatic nuclei of the Fungus also contain only four chromosomes each.

In *Dacryomyces*, the basidium is an elongate cell containing dense protoplasm. At a very early stage two minute deeply stainable bodies are to be observed. These are probably nuclei. At a later stage a single large nucleus is clearly seen, and by subsequent division of this nucleus four nuclei are produced. At the apex of this basidium two sterigmata are formed each of which produces a spore. One nucleus at least passes into each spore. The fate of the other two nuclei has not been ascertained. According to Maire the basidium produces two sets of spores successively, and these two nuclei pass into the second lot of spores. No satisfactory evidence for this statement has however, been adduced, and it is not impossible that the four nuclei may pass in pairs into the two spores. The division of the basidium nucleus shows the usual eight chromosomes, and four chromosomes appear in the subsequent divisions and in the somatic nuclei.

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In *The Scottish Naturalist* for November are notes on Passerine Birds found migrating in moult, by L. J. Rintoul and E. V. Baxter; and *Tanytarsus signatus*, a new British fly from Inverness-shire, by Percy H. Grimshaw.

The 'coral insect' is not dead yet: the reviewer of a zoological work in no less a paper than *The Times*, is so ignorant of natural history that he does not know the difference between a coral polyp and a six-legged bug. (See the *Times* Literary Supplement, 22nd October, 1914, p. 467).

* Abstract of a paper read at the Yorkshire Fungus Foray at Sandsend.

ORNITHOLOGICAL OBSERVATIONS AND REFLECTIONS IN SHETLAND.*

EDMUND SELOUS.

(*Continued from page 357*).

SEPT. 28th.—Started for the network of lochs, the scene of my last year's observations on the parental habits of the Red-Throated Diver. I found the ground no more difficult to get over, on account of the late rains (it poured a good part of yesterday, and the whole of last night), and hardly more swampy, though wetter, than it was then during an unprecedentedly fine summer. The Divers, however, had entirely left the lochs. I saw two birds indeed which might possibly have been of that species, but which, I think, were Mergansers, flying rapidly over the largest of them, but no more. Every loch was deserted and lifeless. I then walked on, to the sea, but here, too, I saw no sign of them. The loch where I had watched the pair that were the principal objects of my study I easily found again, owing to some large stones, one particularly of an elongated shape which I had set up on the summit of an adjoining hill, and where they still remained. The old nest was still easily distinguishable, and I found that its distance from the water was not above six feet—a good deal less than I had imagined.

SEPT. 29th.—Walked to the point beyond, but all I found to do was to watch the waves and the Shags. There is another and conclusive reason why the cormorantic action of holding the wings extended can have nothing to do with any idea of drying them, on the bird's part, which is that it is often performed in the water. Here, too, the wings are generally shaken as a preliminary, and the bird then rides on the waves, holding them exactly in the same way as it does when standing on the rocks, which gives it a peculiar heraldic appearance that is very striking—it would make a good device on a signet ring. As is well-known, it used to be supposed (and the belief may still linger among authorities) that the Ostrich, in running, spread its wings to catch the wind, tacking when this was against it. That these Shags spread theirs in order to sail by them seems a much more reasonable deduction; sailing is proper to the water, and in it the whole art would be naturally included. However, I am doubtful even here. At any rate, I have seen no evidence of such an intention, though, one would think, it must sometimes happen by chance.

Whilst swimming, Shags ceaselessly, at short intervals, dip their heads under the water. I suppose they peer down after fish, or if this is not always their object, then the action may have become a habit, whether they are hungry or not.

Certainly for once that anything comes of it, they must dip thus scores of times for nothing. Sometimes, however, after the head has for sometime been hidden, they will disappear quietly, altogether, the little patch of water, that has known them, all at once, knowing them no more. Or they will rise a little up, and plunge, without, however, leaving the water, but their ordinary way of diving is to leap clear of it altogether, even to the black upturned feet, which are distinctly seen when one witnesses the act from behind. The body, between leap and plunge, describes a curve like part of a hoop, so that, were it to continue so under water, it would make a complete circle. The wings are tightly closed, adding to the smoothness of the bird's whole appearance, nor are they used under water, as are those of the Guillemot, Razorbill and Puffin, but only the webbed feet.* The Cormorant dives with the same action, but it is not as complete or perfect in its course, and I have never myself seen one rise entirely out of the water, the heavier body hardly, perhaps, allowing of this. The energy may be as great, but it does not produce as great results. Thus there is not the same appearance of vigour, and the performance, as a spectacle, loses.

It is curious that, along our more northern coasts, the Shag greatly exceeds the Common Cormorant in numbers, and in the Shetlands has almost supplanted it. Could the smaller of the two species be supposed to have descended from the larger one, it might seem as though some fundamental law, common to land and sea, had produced both the Shetland Cormorant, and the Shetland Pony. This view, however, is not entertained by scientific ornithologists, and there may be even stronger arguments against it.

Oct. 1st.—Even at this late season, the parent Shag may occasionally be seen feeding the young one. When one bird presses eagerly upon another, rubbing with its breast against the latter's back, and causing it to retreat before it, with an embarrassed or deprecating look, this is generally the explanation, though the size and general appearance of the two is now so much alike that it is not at once obvious. All at once, however, the importuned bird, with its back still turned, twists its neck around, and, opening its mouth, received into it not only the beak, but the whole head of its off-spring, who, with the greatest eagerness, tugs what it can get up its throat. The food thus

*This certainly according to my own observation. Macgillivray, however, in his "British Birds," states that he has seen them flying with outspread wings under the boat, an assertion which has lately been repeated. I can only suggest that these were not real birds, but the reflection of ones flying overhead. It was a scene of horrid massacre, not favourable to calm observation. Otherwise, however, the bird must have both methods of progression at its command.

obtained must of course, be fish, but whether in its natural state or partially digested in the crop, cannot be settled by field observation, since the transfer takes place out of sight. It is not often, perhaps, that a parent bird feeds its young whilst standing with its back to it, but the long flexible neck and spare upright figure of the Shag, enables it to do this with the greatest ease. Maternal tenderness, however exhibited, is always a pleasing thing to witness, and probably no one manifestation of it gives greater delight to the beholder than this feeding of the young in birds. But there is something in the towering and stupendous surroundings—the elemental accessories, so to speak—under which it is here performed, that renders it doubly and trebly so. The scene of it is the black and beetling precipice, against which the sea, with deep and sullen sound, ceaselessly heaves and dashes, producing such a turmoil as the eye almost shudders to look on. Yet there are no waves rushing in, as we know them, for the most part, on our English coasts, those long hills of green water, slowly curling over and cresting with spray, to break and fall with a crash ; only a sullen surge and swell, which, as it heaves upon the cliff-line, becomes a very inferno of tossing tumbling foam, great spouts of which shoot half way up towards its summit, even when the sea is not violent. Sometimes (on rougher days) a black jutting bastion of rock, advanced, like a claw, into the sea, will absolutely disappear, for some moments, in whiteness that seems beyond that of snow. The birds, always measuring the distance correctly, stand out of the reach of such inundation, but the spray leaps up past them to the very grass upon the cliff's edge, where the wind catches it and distributes it in mist and drizzle over the surrounding hill-tops. Amidst such showers, in such a vast and horrible commotion, our young Shag is fed. It is, I suppose, the contrast between a quiet scene of nature, the bona dea's cherishing love and tenderness and her raging blind forces, in which the little picture is inset, that adds a piquancy, as it were, to one's normal appreciation of it, under less grandiose conditions.

Oct. 2nd.—Gulls, mostly Herring Gulls, are now feeding on (1) small mussels ; (2) the grain of oats from the sheaves* ; (3) heather seeds and leaves ; (4) small crabs ; (5) various shell-fish. All this is established by the pellets cast by them, which are to be seen all about on the summits of the cliffs. One of these, which I have first examined with a lens, is composed, almost entirely, of the refuse of oat-ears, a few small bits of shell alone being mixed with it. This refuse is pronounced by the owner of the croft or farm I am staying on to be of

* So far as this is concerned, what follows applies to the Herring Gull only.

Scotch and not Shetland oats, and he says, moreover, that the Gulls eat the former kind and reject the latter. Of this he had an interesting proof, for, by some accident the two got mixed up in one of his sheaves. This, one day, he saw quite covered with Gulls, and, on coming to it, found that only the Scotch oats had been taken by them. The Scotch oats are considered to be the best, but my landlord does not endorse this view, and, if anything, prefers the Shetland. This makes the discrimination of the Gulls (unblunted, we may suppose, by national predilection), all the more remarkable, and seems good evidence that the sense of taste in birds, is highly developed. The deft scratching of the head or neck, with the foot, is another accustomed action with Shags, as they sit on the rocks. Looking down, from a height, on to any assembly of them, one may have a full view of a bird's chin, turned entirely upwards, its head, as a matter of toilette convenience, being bent down close to the rock, to be scratched. The bird having a large, curiously shaped and completely webbed foot, its quick and neat little motion, when used for this purpose, is very nice to see. The flapping of the wings is almost as much a feature with these Shags as the holding of them out. Great energy often enters into this action which may last for quite a time. This is especially the case towards the end when the strength and vigour with which they are moved is such that quite a special character is given to this last stage of the performance. The sensation imparted must needs be a very pleasurable one, and I know of no other bird that seems to enjoy it so much.

It is common to see a Gull or two standing amidst these Shag gatherings—often on their outskirts—and a pair of Great Blackbacks, more especially, adds greatly to their picturesqueness. But though there is little or no hostility between the two species, yet they do not much affect each other's society, but keep, for the most part, apart. I have, indeed, seen a Herring Gull standing just on the verge both of the rock and of such an assembly, put to sudden flight over it by an aggresive movement on the part of the Shag nearest him. The same fate, however, might have overtaken him, had he been a Shag himself, or, perhaps, had the Shag been a Gull, though of this I am more doubtful. But birds sometimes act as though possessing the rudiments of a sense of humour, which often consists in some sudden antithesis or incongruity. It was the Gull's position just on the edge of the precipice, which apparently suggested to his neighbour the propriety of sending him over it—a propriety which, with enlarging faculties, would be seen as fun. Indeed, I have often wondered whether the god-like faculty of humour, as, in its highest human developments, we may well call it, did not originate

in something like practical joking.* A practical joke, when effective, generally presents some salient antagonism between what is expected to happen and what does happen—between the is and the ought to be—and this, in effect, is the pivot upon which some very advanced humour turns. The inimitable Bab Ballads may be appealed to in illustration of this contention, and the same sense of contrast, more subtly evoked, is often the ultimate cause of why we smile when reading Shakespeare or Cervantes. From the crudest and silliest practical jokes, one may pass by degrees, to those exhibiting humour of a less low—sometimes, indeed, of a high kind, but if the gap between a bird and man, in this kind of perception, be deemed unbridgeable, then for the latter let us substitute a dog, which sounds much less extravagant. Now a dog, as Darwin has observed, will lie down with his master's stick in his mouth till he comes to take it from him, then race away with it, lie down again, and repeat. From an unexpected push, to this, the interval does not seem quite so enormous, and if our Shag were to pass it, it is not only dogs he would have caught up to. Many a man's sense of humour is no more developed ; indeed some men and numbers of women, have, apparently none, so that, after all, no bridge is required.

Oct. 4th.—Watched a Herring Gull feeding in a very interesting manner. The tide was low, and still falling, and as the heads of rocks and floating fronds of seaweed appeared above it, the Gull would sometimes swim towards them, peer at them, as though looking for something, then sheer off again, and keep turning and tacking from side to side, directing always a piercing glance down into the water, as it seemed, and not upon its surface. It seemed in constant readiness to strike, every now and then nodding forward with its head as though about to do so, and then retreating it again, the opportunity being lost. Always there was the same indeterminate course, seeming to be governed by a general, but not by any special plan. All at once, after peering eagerly forward, it rose on the wing, a little above the water, and then plunged, beak foremost into it, its head and shoulders being submerged. When it reappeared, it was swallowing something which it had seized under the water. It then swam about again, as before, and, in a minute or two, rose and plunged again—this time more violently and from a greater height—two or three feet perhaps. It again emerged with something, but I could not, any more than the first time, see what it was—fish, crab, mussel or barnacle. From the way, however, in which the Gull often made ready to rise, but desisted, as though the object aimed at were gone, I judged it to be one of the two former.

* And this, again, in the torture of one's enemies.

Other Herring Gulls were feeding at low tide, on the beds of mussels with which the rocks furthest out are lined. They pulled them off in a leisurely connoisseur-like fashion, with slow step and keen, if something of a blasé glance. They did not retreat before each incoming wave, but let it splash all over and about them, keeping their places, unless well-nigh washed out of the way. This boldness and contempt of salt water contrasts very strongly with the way in which wading birds run before the tide, when feeding on the wet mud or sand, e.g., the Redshank, Oyster Catcher, Knot and others. The Ringed Plovers are more venturesome—at least on a calm day, and at the very end of the voe. Under such emboldening conditions these pretty little birds may be seen chasing each baby wave, as it recedes, picking up, in haste, such palatable morsels as the exposed shore may offer to their view, and allowing themselves to be overtaken, shank-high, by the returning flood. But there is no foam or spray here, a few placid bubbles, merely, nothing to frighten them.

All the while they keep uttering their little inspiriting note—chee-ree, chee-ree—a sort of seashore chirrup, less plaintive than is usual with birds of their class. The first idea conveyed to one by these soft little creatures, with their dainty yet brisk motions, quick little runs and sudden stops, abrupt, but becoming, is one of peace and harmony, but longer observation shows that a war-like spirit is hidden under these surface appearances, which, at any moment, may break out. Almost everyone of them, in turn, seems highly indignant with some other one, and a succession of little pitter patter chasings, ending, as a rule, in a flight along the strand, is the result of this tension of feeling. Sometimes there is a skirmish when the two, for the time, most indignant ones, darting at each other, with fanned tails, stand for some swelling moments, side by side, each with a strong list towards his enemy. Then come some fierce little peckings, but they desist, all at once, as if things were becoming too serious, and fly away mutually scandalised. Their usual gait is the little run before mentioned —much more rarely a walk—but sometimes they hop on one leg, or stand for awhile so, and occasionally make a curious sort of jump with the two. Everything is by fits and starts nothing continuous, but all—even to each little peck down into mud, sand or seaweed—as though it sprang from a sudden quite novel idea. They bathe very prettily, in little pools of the shore, just where these mingle with the sea and deepen around them with the swell of the tide ; here they sit, showering with the wings and dilating the plumage for the drops to pierce it, after the usual fashion. Having finished, they rise gracefully on the wing, and flutter, for a little, a few feet above the scene of their recent ablutions, before descending, again, to run off.

Some sheep, now, come down over the rocks, and begin to feed on the seaweed, thereby discommoding the Gulls. The latter are not frightened, but have to avoid them, and walk about with an offended look, seeming much annoyed. It is a curious ousting. One is accustomed to see Gulls inland amidst sheep and kine, but this reversal of the position is less familiar, and much more picturesque. The sheep evidently like their seaweed quite fresh from the sea. They pay no attention to it where it lies exposed, but, bending their heads over the water, take it, as it is left by the receding wave. When the wave comes in again, they avoid it in a very nonchalent manner, and often have their noses well under water before turning their heads aside. It is the long brown seaweed that they like, and pleasant it is to see a long streamer of it hanging, wet and shiny, from their mouths as they munch. Whilst one watches these sheep, thus browsing the seaweed, one or other of them will often have the head and legs completely hidden by the rocks. The hallucination is then produced that it is not a sheep at all, but a Polar Bear one is looking at, for the white body looks just like one, and the marine setting, though not of an arctic character, seems much more appropriate to Polar Bears than to sheep, with which creatures, till one has become familiar with this phase of their character, it has no associations. After a time, however, the novelty goes, and, with it, the Polar Bears.

Sheep in the Shetlands are very fond of browsing on seaweed. They come down the descendable places of the cliffs—which are not very many—and walk right out on the rocks, bad as they are here to walk on. But they do not do these things with impunity. Here and there a carcass lies rotting to show that they sometimes pay for their temerity with their lives, and I have myself assisted at the capture, by boat, of a sheep that had got on to a narrow ledge of rock, only a few feet above the sea level, at the mouth of one of the numerous caverns that there are here, and was unable to get off again.

Examination of the rocks where the Gulls have been feeding, shows that they often pull off one valve of the larger mussels, leaving the other one empty, and hanging to the rock. These Herring Gulls fly in pairs, one sweeping to the other from a distance, and greeting it with wailing cry. If in pairs now, why not throughout the winter ? I have no doubt they mate for life.

Oct. 5th.—Rock Doves roost in caverns made by the sea, which are never dry even at low tide. They seem to be very wary, feeding on the croft-lands in the early morning only, or on wet afternoons, when not likely to be disturbed. They often assemble on the grass above the entrance to their caves—for at their mouths these may be lofty—and apparently feed there, as they keep pecking about. Thus on any alarm they can either

retreat into the cave or fly away. This caution may have been developed through fear of rapacious birds, once more numerous than they are now, though even now they are a force to be reckoned with, for I found, this afternoon, on the hill side, not far from a cave, the complete pluckings of a Rock Dove—no trace of the body to be seen. This may have been the work of a Peregrine. This generalising, however, it should be said, is only on the strength of a few observations.

Shags bathe now, but not often, and very differently from the way they do in the spring—with much less violent actions that is to say. This supports my view of the bathing, in this species, having become a sort of sexual antic or display.

Oct. 6th.—I have spoken of the Shag's habit of constantly dipping its head whilst swimming. I have since noticed how the neck of one that I was looking down upon, almost perpendicularly, was stretched out straight in front of it under the water, and to-day, again, I have had a good example of the dipped head being quietly converted into a complete dive by one of these birds, without the usual leap or any other special action. It seems pretty plain that the bird's object in thus sinking its head is to see under water, and that when this is followed by total submersion, it means that the fish has been sighted. Yet it is not all so plain as it might appear off-hand, for when these birds are undoubtedly fishing, they do not act in this way—or at any rate not habitually—but time after time, make the ordinary leap under, from the ordinary floating attitude. As to this, however, it may be said that a bird when really hungry and definitely 'on the job,' would not waste time in thus, as it were, feeling, or rather seeing its way before it.

Like the Eider Duck, the Shag is often to be seen swimming in very troubled water, moving lightly amidst swirl and foam, cresting 'the curled wave' and only diving as one breaks in fury about him. He can live where no boat can, since sinking, the perdition of the boat, is his constant security. Yet sometimes accidents happen, and a certain percentage of these may be fatal ones. Only to-day I witnessed an example, though not of the latter kind, when a bird, seeking to land upon the rock, was caught almost in the act by a rather boisterous wave which flung it back upon the water, and then up again in a game of pitch and toss. From this it escaped in a somewhat dishevelled condition, nor was it till a moment or two had elapsed that it was able to dive and thus save the situation. Had the sea been higher at the time, this Shag might have had its life battered out of it, perhaps upon its own nesting rock. It is more probable, however, that if it had been really high, it would not have attempted to land from the sea, but have flown in after the more usual way. These Shags, now, are quite

silent. During the breeding season they have a deep gutteral note at their command, and they also utter one a good deal like it, but accentuated, when under the combined influence of terror and indignation, as when approached closely whilst on the nest.

Oct. 8th.—The Ringed Plovers are not now in evidence on the seashore. Their place is taken by some very different birds —Crows, namely, of the Hooded variety (Scottice Hoodies). These—and the remark applies to all their tribe—are 'nothing if not *theatrical*.' Their 'business,' as one may call it is redundant and seems to make a stage of the foreshore. With a grotesque kind of stealth, an exaggerated wariness which seems wholly unnecessary, they approach a rock not large enough to conceal any enemy, and after some sideway glances, expressive of deep penetration, pick off something from amidst the seewead that clothes it, with which they retire. It can only be a small limpet, for (as after examination shows), there is nothing else edible on the rock, yet it cannot now be contemplated without a look—or rather looks—of diabolical cunning. Nothing is done by these birds as other birds would do it, that is to say in an ordinary unreflective way. With them every peck is a matter of strategy, of successful tactics, something entitling the giver of it to congratulate himself as being the possessor of a highly superior intelligence. This, in point of fact, may be the case. Marvellous stories are told of Crow cunning, but, allowing them to have it, yet this is undoubted, that they have the appearance of having it in a still higher degree. They masquerade with this, so to speak, it is a property of theirs, the mysterious cloak of the stage murderer, with his 'damnable faces' is ever about them.

Though these Crows form a band, yet a little observation soon makes it evident that they go in pairs. That they mate for life has, indeed, often been asserted, and is, no doubt, correct, but whatever credit this may entitle them to (in common with numbers of other birds—perhaps the great majority), the relations which it brings about are not wholly amicable. Should anything too large to be immediately disposed of, be found by the male, the female hops up and apparently puts in a claim to a share of it; but the plea is not allowed unless the haul is so considerable as to admit (after a time) of a second appetite, without wrong done to the first. In this case, the position and rights of the partner are recognised, or at least not strongly disputed. Should, however, the female Crow be the finder, the male asserts his right, as superior, and is deferred to because he has might to support it. This is obviously not quite the same as might being right in nature, and I am happy to say that the distinction applies to a number of other cases which I have observed, and not to this one alone. It is only

where a right has not been established on these lines that any bird (or perhaps any animal) ventures to dispute it, and then only until it is sufficiently made out. It may be thought that this principle is sometimes lost sight of in human relations, but I believe that anything which in appearance contradicts it, is to be looked upon as a by-product merely. It may perhaps be held that though, as the weaker, the female Crow in these cases may be practically compelled to give way, yet that she does so willingly, in a spirit of wifely submission, but I have seen a good deal of what may be called argument on the subject, and it has not been of a friendly nature.

Having feasted in a somewhat perfunctory manner on the foreshore, these Crows fly off to a more extended banquet over the land. Later they return, and regularly search the seaweed covered bank of rocks, skirting one side of the voe. One of them bluffs, as it were, a Herring Gull, feeding on the adjacent sands, by coming up rapidly sideways (like Mr. Winkle's horse), and so causing it to give place by the mere surprise of the thing, as it would appear, and, on the success of this coup, it is joined by its partner. Later, however, the Gull having had time to reflect, and become slowly indignant, advances in a bellicose and properly straight forward manner, and both the Crows retreating without a blow, re-enters upon his location.

Whether a curious sort of aerial manœuvring amongst these Crows, in which two of them alternately hover perpendicularly over one another, the upper one dropping, at intervals, almost upon the back of the one beneath him, to rise again, as the latter swerves aside as he always does—whether this is the nature of combat or antic, it is not easy to say.

Rock Doves also come down upon the tidal shore, and peck upon it, as though picking up seeds. It is not easy to make out what they get, but neither is it with the Ring Plovers. In the latter, however, it is probably small crustaceans and insects. If it is the same with the Rock Doves—and it is difficult to see what else it can be—then here is an interesting topographical modification of habits, as one may call it.

A Great Black-backed Gull walks out into the receding waves, and apparently does her foraging on the sands which they cover. She makes a continuous series of jobbings down with her bill, in which, as she rises it, she sometimes seems to have something, though it is impossible to say what. Her young one flies up to her, and pursues the same tactics, as afterwards, for some time by itself. The prey may be sand-worms. It can hardly be fish, with such a modus operandi, though that there are small fish close in shore—probably in shoals—is shown by the actions of a Kittiwake which constantly hovers over the water there, without going farther out,

and every now and again drops head first into it, sometimes securing one, after the fashion of an amateur Tern—for he is not on a par with the latter bird, in skill, or, at any rate, in grace.

A little before this, three Mergansers were swimming in these same shallow waters, but they, all at once, flew off, alarmed, as it would seem by some seals—also three in number—that came quite near to them, as close in shore, apparently, as themselves. After a time, these birds return and fish, sometimes within a yard or two of the edge of the sands, straining over the small though now rough waves, as they break all amongst the white water. Ever and anon they dive, and on two, if not three occasions have, on emerging, a small blackish object (as it looks, though I suppose it is a fish) in their bills. They may have been more uniformly successful than this suggests, but if so, must have swallowed the fish under water. Whilst thus fishing, these Mergansers rarely dived with their characteristic action, which is similar to that of the Shag, though less pronounced. They kept dipping and ploughing the water in front of them, with their bills, and, in the midst of this, and often, as it would seem, in consequence of it, they would either go down with a mere sudden slap, or disappear informally (as described in the case of the Shag). Sometimes, before diving, they would make a sudden dart forward with extended head and neck, in pursuit of something which they had sighted. It thus seems evident that the head is dipped to enable the bird to sight its prey under water, before diving, and this greatly strengthens the probability that the same explanation holds good for the Shag. Strictly speaking, however, these Mergansers did not dip the head as a whole, but only those parts of it near to the base of the bill, which latter was always sunk. So, at least, it appeared to me, though I cannot understand how, in that case, the eyes were under water, as they must have been to be of any use to the bird. Probably they were just under it, but no more.

The Whimbrel also—contrary to what one might expect—walks up to these rocks and probes their seaweed with his long, curved bill. A Heron, however, standing at their edge, in the water, seems merely to be pursuing his customary avocations as a fisher—and soon he strikes.

October 9th.—This morning, I watched a female Eider Duck in one of the bays of a small island off the coast here. The way she rode, crested and danced on the waves where they were whited—they were all white to-day—was quite wonderful. A bob of the head, when they broke, was sufficient for her, without diving, but often—indeed in most cases, she did not even do this, but let the curled crest take her and plunge her into a hissing white chaos—a 'vexed Bermoothes' of foam

amidst which she appeared and disappeared, now mounting, now in a gulf, like a piece of floating brown seaweed. Sport of the waves, she made the waves her sport, and whenever amidst them, the glasses caught her for a moment turning her from a speck of no meaning, into a shaped thing with life and expression, they showed her to be serenely calm and peaceful, so much indeed, like a 'bird of calm sitting, brooding on the charmed wave,' that the wild commotion around her seemed for a moment to hush itself and fall into harmony with the picture which her appearance so strongly suggested.

The Eider Duck is stated to be a purely animal feeder, but this I may doubt on the evidence. The bird in question came right into the mouth of the little inlet where I was watching, and there she again and again, laid hold of the long brown seaweed, as it was floated up towards the surface of the waves from the rocks where it grew below. She would bob, tail upwards, like the Common Duck of our ponds, and seizing a piece which she could just reach in this attitude, and which obviously offered resistance, gave it a violent pull. What could it have been but the seaweed which the waves, as they troughed themselves, made visible, either on or but just beneath the surface, thus giving her the opportunity of which she, each time, availed herself of seizing one of the long ribbons by its end, so that by the re-swelling up again of the vortex, she got more purchase upon it than she would have had by diving, which last she did much more rarely, though as to the habit born ? But, besides this, to leave no doubt whatever on the object of her quest, she several times swam to where a mass of this same brown seaweed lay on the water, seized it in her bill, pulled and nibbled at it. Now nothing in the shape of limpet or periwinkle—or, in fact anything so far as I have been able to make out—adheres to the smooth broad blades of this fresh-growing brown seaweed, and therefore, as it seems to me, this Eider Duck must have been attacking it for its own sake. I could see the smooth shining fronds clearly enough through the glasses. They appeared quite clean and naked as ever, nor did the actions of the bird suggest any picking off process. They appeared to me more to suggest that she was nibbling at the seaweed though I was unable positively to make out that she swallowed any.

Since coming here I have only twice seen the male Eider Duck—three or four together and a single one—on each occasion flying. The females are more numerous, but by no means abundant either, nor have I seen more than three together.

Though Shags, either when disturbed or otherwise, generally fly directly down from where they are standing, to the sea, or, at most, sweep a little over it before alighting, yet sometimes

they show much greater powers of flight than this suggests. Thus, to-day, a large flock of them acted much more aerially, rising to some height, and then wheeling round and round, the wings being often held extended, and not flapped during one or two fairly wide circles. Sometimes they swept swiftly down with them thus set, tilting their broad surface this way and that to catch the wind advantageously; but, more than this they often rose as they thus sailed and circled, shooting upwards without effort. The effect of so many of these large dark gloomy-looking birds disporting thus with ease, though hardly with lightness, was helped, as it were, by that of a band of Gulls (all Great Black-backs) which had gone off at the same time and floated now with more mastery, yet withal in much the same manner, in wider circles above them.

Oct. 10th.—Started in a high wind to the most northern point of the island which, with the great 'stacks' beyond it, near or more outlying, is all a precipice. It is one of the principal assembly-places of the Shags about here, and some thirty to forty of them were gathered upon it. I got to a projecting stone, overlooking them where the hill begins to fall away, either unseen or sufficiently so not to cause alarm, and soon began to observe what interested me greatly, namely that the birds were amusing themselves by making short flights out from their rock, and returning to it. First one and then another of them, at irregular intervals, would rise from its place, sweep down upon the wind for some distance, poise itself, for a moment, turn, and in a wide curve, which was full of grace, come sweeping back again. This was repeated time and time again, without any ulterior object being discoverable, till it became obvious that the flight was made merely for its own sake, with no thought other than the pleasure attending it. The aerial power exhibited by the various birds in this exercise, as one may call it, was by no means uniform. Some beat the air with their wings for some little time, before holding them extended and motionless, and then, having sailed a part of the way, gave a few more beats and glided on. Others, as they rose, set them at once to the blast, and made the whole circle in this manner, whilst others, again, repeated it several times, or even indefinitely in much the same fashion as Gulls. These superior powers were more and more commonly exhibited as the tempest rose, those birds particularly which stood upon the higher points of the precipice delighting to cast themselves off, on expanded pinions into the dark, wild stormy sky. As evening sank and light faded, the scene became wilder, the wind shrieked, the waters dashed, and the dark circling forms crossed, followed or skimmed aslant one another like embodied forces of the storm. I noticed that many times a Shag sweeping in to its

place, with every intention of resettling itself there—as shown by the down-stretched legs, vibrating wings and general awkward poise of the body—was blown onward by the wind, when, relinquishing the effort, it would turn and sweep gracefully away again, to make another attempt when it next came round, which was often equally insuccessful. In this manner, one or more compulsory flights were often added to the first one taken of the bird's free will. Now as those birds which, equally of their own free will, circled thus continuously, yet passed, on the completion of every circle, over the place of assembly, turning each time and sweeping away again, just as the ones that had first unsuccessfully endeavoured to alight did, the only thing which differentiated them from these latter was that they made no such attempt, but passed directly on, flying a little higher. It seems therefore not unlikely that the voluntary act has grown out of the involuntary one, for it would be a natural thing for a bird which, having returned after its first circle, with the intention of alighting, felt itself being blown on, to give up the idea of doing so—to 'pass" that time as it were, and take another circle—and from this, by a gradual transition the habit of circling several or a number of times, and so at last indefinitely without any recurrent wish to alight, might easily arise. Yet still, in the return to and re-passing over the rock from which the flight had commenced, we should have an evidence of the original single sweep round and resettling at the end of it.

In the case of the Shag, then, we have, as exhibited by different individual birds, and perhaps by the same individual at different times, these three distinct stages of progress, viz., the single short circling flight from the rock and return to it, the enforced repetition of such flight, owing to the wind (in which more or less willingness for it to be so enforced may be observed), and the more or less indefinite circling (without change of route) in which no idea of alighting is suggested to the bird's mind simply by its passing above the rock it flew out from, and for no other reason. But there is a further stage, for, at last, upon the wind attaining a certain degree of violence, all the birds leave the rock, and their flight becomes continuous and sustained, without having any fixed location in space, with reference to the starting-point, though it is still a circling one. But now, besides the Shag and such others as we have, let us imagine two as yet non-existant species of Cormorant, one of which is capable of soaring to a certain extent, especially when helped by upward currents of air, whilst the other soars as grandly as an eagle. Should we not then see, in these habits of the species in question, the origin of the soaring habit? Having all the stages before us we could not, logically, avoid this conclusion, so that so simple a thing as a bird's throwing

itself off from some high rock or promontory to make just one circle and alight there again, would have to be recognised as the first step towards that supreme dominion of the air, which, for the non-predaceous naturalist and the appreciative portion of mankind in general, make the 'King of Bird's' crowning glory.

I suggest that, considered in the light of the facts which I have recorded, what is here imagined is very likely to have been the case, not with all soaring species of birds, indeed, or perhaps with the Eagle, but with some or other of them. At any rate here is an actually observed beginning, and early stages, going some way along a path that seems to lead to the end in question. Another interesting point arises in considering the initial motive or impulse influencing these Shags to make their little circling flights out from the rock, instead of standing there as usual, till they fly down to fish in the sea. Inasmuch as I have not observed them doing so except upon stormy days, it has appeared to me either that the birds become pleasureably excited by a strong wind, or that they take the opportunity of utilising it in this way. The latter, however, is part of the observation, but I believe that the excitement comes first. Now a bird's power of soaring is largely dependent upon the wind. Even an Eagle, as I have observed, has to flap heavily along on a perfectly still day. Probably, then, these Shags could not have floated as they did, unless with the help of a fair wind, but the state of excitement which this produced in them, seemed to me evident, and to increase as it grew higher. In the case of this species, therefore, should it ever, along the lines indicated, become a recognised soarer, a certain emotional element would have produced the first step in the utilisation of natural forces leading to this end. Whether this will ever be the case who can say? but it seems to me not unlikely that the Shag will become in time more aerial in its habits, even as the Frigate Bird and Solan Goose have become, possibly in a similar way. The general theory is that habits have been brought about through natural selection, in relation to the welfare of the species. From my own observation, however, I cannot help thinking that some may have had their origin in a trick or proclivity, or through some unexpected and curious channel standing in no very close relation to the mode of life, or, at any rate, to the more important matters in such mode of life, of the species in which they obtain, though they may have been afterwards worked in, in conformity with these. Such inconsequential habits, as one may term them, might, notwithstanding, persist as being rooted in a creature's psychology, which would, for long, be a permanent factor. In other words they are not really inconsequential, as, in fact, nothing is.

1914 Dec. 1.

MYCOLOGISTS AT SANDSEND.

C. CROSSLAND,
Halifax.

THE twenty-sixth Annual Meeting of the Mycological Section of the Yorkshire Naturalists' Union was held at Sandsend, October 3rd to 8th, for the further investigation of the Mulgrave woodlands. This is the eighth autumn on which these grand old woods have been selected by the Committee for the Annual Foray, in addition to four unofficial spring gatherings. The intention has been to acquire by these successive visits an approximate knowledge of the mycological products of a definitely limited area. This we have been enabled to carry out at Mulgrave Woods through the kindness of their noble owner, The Rev. the Marquis of Normanby. The development and results of the investigations, regularly chronicled in *The Naturalist*, have, we venture to think, justified the efforts made. Headquarters were as usual, at the commodious and convenient Normanby House, close to the woods, and we were again granted the use of Sandsend school for work and exhibit rooms.

The members of the Committee present were Mr. and Miss Massee, Kew ; Mr. Harold W. T. Wager, Leeds ; Sir H. C. Hawley, Bart., Sussex ; Messrs. Alfred Clarke, Huddersfield ; Thos. Gibbs, Wirksworth ; C. H. Broadhead, Thongsbridge ; M. Malone, Bradford ; A. E. Peck, and T. B. Roe, Scarborough ; Miss C. A. Cooper, Robin Hood's Bay ; and the Secretary. Mr. Cheesman was attending the British Association Meeting in Australia from whence he had forwarded to Miss Cooper specimens of the brilliant *Polystictus sanguineus*, and the peculiar *Schizophyllum commune*.

Other members of the Union who attended were Messrs. J. Ackroyd, Batley ; Thos. Hebden, Keighley ; R. Fowler Jones, York ; J. W. Taylor, and Greevz Fysher, Leeds ; and friend Thos. Hey, Derby.

It is gratifying to note that the Whitby Naturalists' Society, including the Rev. J. W. Bowman, Miss Cooper, and others are now displaying much interest in mycology, and had organised a foray to take place in Mulgrave words on the Saturday afternoon, under the leadership of Miss Cooper and Mr. A. E. Peck.

The charming weather which prevailed during the week was suitable for searching the woods and fields, but the scarcity of fungi was somewhat disappointing. It very early became apparent that the records would be much lighter than usual. The woods generally were drier than we have seen them on any previous occasion ; moist places being limited, and mostly in the neighbourhood of the streams. The larger agarics were particularly scarce, especially such as depend on moist soil

and humus for their pabulum. There were no crowds of anything anywhere similar to such as we have seen covering the ground in suitable places, and on decaying logs, at this time of the year. Many of those found had to be diligently sought out; possibly this may account for the number of small Mycenæ and other species which occur on bits of rotting branches, twigs and dead leaves in moist places, overgrown and sheltered by this year's herbaceous vegetation.

The foray was fixed a fortnight later in the reasonable expectation that some little variations in the fungus flora might be seen, more particularly in the Cortinarii. This is by far the most numerous genus in the European Agaricaceæ, and, as a rule, the species occur rather later than most agarics. There are over 270 species known to Europe, 190 of which have been recorded for Britain, 113 for Yorkshire, and 52 for Mulgrave. Yet, only two were found this time, one of the two however is an addition to the district, making a previous 51 into 52.

The collecting baskets, vascula, pocket boxes, and glass tubes, came in day after day with fewer contents than ever.

The past summer and autumn have not been favourable to a luxuriant development of fungus myceliuni (or spawn) and fruit; but, on the other hand, what has been infinitely better for the country, the seasons have been in favour of the growth of fine crops of farm and garden produce of all descriptions, and a splendid all round harvest and reaping time with less disease; a dissatisfied farmer has been a rarity this autumn in Britain.

A couple of the ubiquitous *Armillaria mellea* even were brought in which had not succeeded in ringing their stems for want of sap. The ringless stems and absence of one or two other usual features tended at first to obscure their identification, and they were an all-round puzzle for a little while. Eventually their identity dawned on one of the examiners and they were accepted amid an outburst of merriment, etc., at the idea of all being temporarily taken in by so common an agaric. It is certainly very variable, but normally its ring is one of its most prominent features.

There were exceptions, of course, as there are in everything. In one place a good sized hand basket was filled entirely with the edible *Agaricus augustus*: fine specimens, in the pink of condition. These furnished an extra tasty dish for the breakfast table the following morning; they are closely allied to the ordinary mushroom and equally good. Unfortunately thirteen sat down, and the supply was not sufficient to go round.

One remarkable feature at these forays is, however small the number of species found, fresh ones, not previously seen in the district, are almost certain to be met with. This fact

lends zest to the work, and imparts a certain amount of satisfaction. Of the 10 *Tricholomas* brought in, 3 were additions to the Mulgrave Flora, 1 being new to Yorkshire. So it happened with the genus *Pholiota*, except that both the 2 additions were new to Yorkshire. Again, with *Lactarius*, of the 3 new to the district, 1 is new to Britain: the only new Britisher discovered.

Each day the specimens as determined were labelled and laid on tables in the workroom for general inspection or for discussion.

The various groups were represented by the following number of genera:—Gasteromycetes 3, Agaricaceae 39, Polyporaceae 8, Hydnaceae 5, Thelephoraceae 6, Clavariaceae 3, Tremellaceae 5, Uredinaceae 3, Pyrenomycetes 7, Discomycetes 20, Phycomycetes 2, Deuteromycetes 1, Hyphomycetes 8, Mycetozoa 8.

To confine further statistics to the Agaricaceae, it may be said that Mycena was highest with 19 species, then follow Russula with 13, Pholiota 11, Tricholoma 10, Hygrophorus 9, Lactarius 9, Collybia 7, Naucoria 5, Amanita 1, Lepiota 2, Inocybe 2, Coprinus 6, and so on.

The aggregate number collected was about 320, as against 612 in 1908, so that we had to be content with a much smaller haul than usual. However, it was found that the 40 recorded below are all additions to the list for the district.

Those marked † are new to Yorkshire, and *† new to Britain. (For results of the June visit, see *The Naturalist*, August, pp. 251-2).

† *Tricholoma loricatum* Fr.
,, *lascivum* Fr.
,, *subpulverulentum* (Pers.)
Mycena prolifera Sow.
,, *saccharifera* (B. & Br.)
Nolanea infula Fr.
† *Pholiota luxurians* Fr.
† ,, *subsquarrosa* Fr.
Hebeloma ischnostylum Cke.
Flammula lenta (Pers.)
Naucoria pediades Fr.
Galera hypnorum.
† ,, var. *sphagnorum* Fr.
Crepidotus epigaeus (Pers.)
Cortinarius (Phleg.) *anfractus* Fr.
Hypholoma catarium Fr.
Psathyra semivestita (B. & Br.)
*† *Lactarius lividus* Lamb.
,, *involutus* Soppitt
,, *minimus* W.G. Sm.
Russula coerulea Pers.
† ,, *chamaeleontina* Fr.
Boletus aurantiporus Howse.
† ,, (*Gyrodon*) *mcqueenii* Mass.
Polyporus cuticularis Fr.
,, *epileucus* Fr.
,, *fibula* Fr.
Fomes ulmarius Fr.
Fomes ribis Fr.
† *Daedalea vermicularis* Pers.
Phlebia radiata Fr.
Stereum ochroleucum Fr.
Corticium porosum B. & Br.
Hypoxylon cohærens (Pers.)
Rhytisma salicinum (Pers.)
Byssosphaeria thelena (Rabh.)
Ceratostomella rostrata Fr.
Peziza saniosa Schr.
Cenangium furfuraceum D.N.
Pilobolus roridus Pers.
† *Peronospora alta* Fuckel. On *Plantago lanceolata.*
† *Cercospora calthae* Cke. On living leaves of *Caltha palustris.*

It will be seen that *Lactarius lividus* Lamb. is new to Britain ; its full description will be given in *The Naturalist* in due course.

Mycena prolifera Sow. is only new in name ; hitherto it has been recorded as *Mycena galericulata* var. *calopoda* Fr. Recently Miss Massee has proved, by the aid of its microscopic characters, that it bears no relation to *M. galericulata*, and decides it to be *Mycena prolifera* Sow.

On summing up the work done up to date, we find that 1304 species have been registered as found within an area of about $1\frac{7}{8}$ square miles, or to be more definite, 1167 acres. Of course five-sixths of the ground investigated has been the rich old woodlands, but even then, only 5 days have been given on each of the 12 visits.

The places searched on the several forays have been the Sandsend Valley and sides as far as the Old Foss Mill on the Barnby Beck, rather over two miles, and about the same distance up the valley and hill sides drained by East Row Beck, including the Dear Park, Gillam or the woods beneath Nineteen Lands, the vicinity of Mulgrave Old Castle, Castle Rigg, The Hermitage, Devil's Bridge in Biggersdale Hole, Ash Holme, The Haggs, Sandsend Rigg, etc.

Of these 1304 recorded species for this small area, about 173 have been additions to the County records, since the publication of the Yorkshire Fungus Flora in 1905, 28 of which proved to be new to Britain, and 2 new to Science. The two new to Science are *Pluteolus mulgravensis* Mass. and Crossl., and *Clavaria crosslandii* Cotton. See *The Naturalist*, 1912, pp. 85-86.

For these most excellent results every credit is due to our worthy chairman, who has gone to the trouble and expense of 11 or 12 journeys all the way from Kew to preside over the investigations : accompanied five or six times by his daughter, Miss Ivy Massee, a rapidly rising expert in mycology.

Sir H. C. Hawley has this year journeyed from Sussex, and on three or four previous occasions from London, to join in the work.

On our third visit we estimated that if allowed the privilege, and persevered in the work, we might secure at least 1000 species, so that our original estimate has been greatly exceeded. We owe much of the success to the vigorous and diligent investigation by members of the Mycological Committee, and other members of the Union, present on each and every occasion.

The constant additions make it evident that the ground is by no means fully worked for its production of macro-species, and there must be numerous micro-species on both living and dead branches, twigs, leaves, and herbaceous vege-

tation generally, awaiting discovery and investigation. The results obtained here point very clearly to a vast amount of field mycology still remaining to be done throughout the county.

A remarkably fine series of highly enlarged coloured diagrams 21 ins. by 15 ins., illustrating the Diseases of Forest Trees, in nine sheets,* and of Fruit Bearing Trees and Plants,† were hung around the workroom walls by Mr. Clarke. Each drawing in both series is accompanied by a similarly sized sheet giving a brief account of the disease, with a statement of the measures to be taken for their prevention or eradication, printed in large type. The original drawings were specially prepared for the Board of Agriculture and Fisheries by Mr. Massee, for use as wall-sheets in lecture rooms, schools, and other centres of Education. Mr. Clarke also brought to the meeting a good sized fascicle of copies of coloured drawings he had made from Fries's illustrations of European agarics. Miss Massee showed a quantity of Mycena drawings, each sheet including microscopic details, and a stout fascicle of coloured drawings illustrating fungal plant diseases. There was also a large coloured series of Lichen drawings made by Mr. Massee some years ago from type specimens.

Addresses given and papers read during the foray were as follow :—

'Fungi from Various Standpoints,' by Mr. Massee ;
'The Development of the Basidia in Tremella and Dacryomyces,' by Mr. Harold Wager ;
'Mycena galericulata and its Allies,' by Miss Ivy Massee ;
'Notes on some Fungi of the Sea-shore,' by Sir H. C. Hawley, Bart.

Votes of thanks were heartily accorded to the Rev. the Marquis of Normanby for his generous continued permission to explore Mulgrave Woods ; and to the Rev. W. G. Harland, for kindly allowing the use of Sandsend schoolrooms in which to work out the finds.

It was decided that the Foray for 1915 be held in the neighbourhood of Scarborough, September 24th—29th.

ADDENDUM.

The business meeting was held on the Monday evening and included a pleasant little ceremony, which may well be considered as notable in the history of Yorkshire Mycology. Mr. Crossland, who for many years has held the post of Secretary to the Mycological Committee had intimated that, owing to advancing years, he would like to be relieved of this office.

* The nine drawings and keys may be obtained from Wyman and Sons, Fetter Lane, London, E.C., or other booksellers.

† The seven sheets and keys can only be obtained from the Office of the Board, Whitehall Place, S.W.

It had been decided by the Committee to make a little present to Mr. Crossland as a token of esteem and some acknowledgement of his most valuable services as secretary and recorder. This took the form of a suitably inscribed piece of silver plate. Mr. Massee made the presentation and spoke in terms of high appreciation of the value of Mr. Crossland's work in the field of Mycology, his devotion to the keeping of our County records, and the amiable and efficient manner in which he dealt with the business part of the Annual Forays. Mr. Wager also

Photo by] [*A. E. Peck.*

Group of Mycologists, Mulgrave, 1914.

Standing.

Sir Henry C. Hawley, Bart., R. Fowler Jones, T. Hey, A. E. Peck, Harold Wager, C. H. Broadhead, T. Gibbs, and M. Malone.

Seated.

Miss Ivy Massee, Geo. Massee, Charles Crossland, Alfred Clarke, Thos. Hebden.

spoke and admirably voiced the feelings of those assembled when he referred in particular to the affection held for this veteran Yorkshire Mycologist, by his fellow workers. Mr. Crossland briefly and feelingly acknowledged the gift, adding that his cordial co-operation would always be available to those who succeeded to his office.—A. E. Peck.

On the election of Officers and Committee for 1915, Mr. Massee expressed a wish to be relieved of the chairmanship

which he has held since 1899. The occasions on which he could not be present have been very few. It may be said that Yorkshire Mycology owes its success to his constant support and influence (see *The Naturalist*, 1908, pp. 96-8). At the Doncaster meeting held in 1891 he was the means of establishing our Annual Foray since so well supported by the Union. Canon Fowler was its first chairman. It is needless to say that Mr. Massee has obtained a very high standing in the Mycological world. The committee were sorry at the prospect of losing his valuable guidance as chairman, but being so far away from the county he pressed his desire to be relieved of the office.

Mr. Harold W. T. Wager, F.R.S., F.L.S., was unanimously elected in his stead, and a hearty vote of thanks passed to Mr. Massee for his long and valuable services.

Mr. A. E. Peck, F.L.S., 33 Valley Road, Scarborough, was unanimously elected Secretary; Representative on Executive, C. Crossland, Halifax. Other members as last year with the addition of Mr. Massee, V.M.H., F.L.S., Kew, and Mr. W. N. Cheesman, J.P., F.L.S., Selby.

MOSSES.

***Grimmia subsquarrosa* Wils., in Yorkshire**.—Whilst working over some siliceous rocks on the south end of Moughton Scar, near Austwick, I found a Grimmia which I took to be *G. incurva*, but Mr. H. N. Dixon, M.A., F.L.S., points out that it is *subsquarrosa*, the gemmæ, which are abundant, and also the basal areolation being characteristic. This appears to be the first record of this species in Yorkshire. Mr. F. Haxby and I have found many new district records for mosses in this locality, a list of which we hope to publish shortly.—CHRIS. A. CHEETHAM.

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CRUSTACEA.

Edible Crabs at Bridlington.—While walking along the beach between Auburn and Bridlington, on October 25th, I noticed large numbers of the Edible Crab, *Cancer pagurus*, washed up by the waves; there were certainly tens of thousands. Within an area of a few yards I counted over eighty dead specimens, many of saleable size. It seems difficult to account for such a large mortality, unless, as may possibly be the case, it is due to the mine explosions that have taken place in the North Sea area.—T. AUDAS, Bridlington.

—: o :—

We regret to note the death of Dr. H. J. Johnstone-Lavis, the well-known geologist, who was killed in a motor accident recently in France.

FUNGI FROM VARIOUS STANDPOINTS.*

G. MASSEE, F.L.S., V.M.H.,

FORTY years ago there was only one text book dealing with fungi to which British Students had access, and that was the one written by Berkeley, who was thoroughly in touch with Fries, the great Swedish mycologist. In their day emphasis was laid on such characters as could be determined in the field with no greater assistance than that provided by a pocket lens. No high powers of magnification were used. At the present time we look at species very much from another standpoint, and more stress is laid on microscopic characters. To-day there are two types of mycologists, the field mycologist, and the laboratory mycologist. There is, however, a danger in laying too much stress on microscopic characters. One type of mycologist ignores microscopic characters, the other goes to the other extreme. It is necessary to give not too much importance to any *single* character, but to judge a species by the sum total of its characters, Speaking generally, microscopic combined with macroscopic characters should be considered in order to arrive at a correct determination. In the Discomyceteae however, microscopic characters are of special importance.

In the Uredineae, as shown by Sydow, host plants are of the greatest importance in determining species. In the larger number of species in that Order it is impossible to determine species from spores only, except in very few cases, and particularly when the fungus is in the uredospore stage. In the Uredineae successful infection tests are indispensable.

In the study of mycology it is important to begin with a scientific basis. By commencing with a systematic study of the subject a safe starting point is assured.

Fungi are very variable, their extreme variability being due chiefly to differences in the period of growth, and to climatic conditions.

What is being done in the herbarium is absolutely valueless from a systematic point of view, so far as the Agaricaceae are concerned. Frequently the merest scraps sent by some far-away correspondent are used, the student being quite unfamiliar with the type from a field point of view.

The diseases caused by fungi constitute a very important matter, and Yorkshire mycologists have been pioneers in their investigation. The economic side of the subject is of very

* Delivered at the Yorkshire Fungus Foray at Sandsend.

great importance, the annual loss caused by these diseases being very considerable.

We do not yet however know enough of the life histories of parasitic fungi. We know parts or stages, but not always the entities or complete life-cycles. There are many ways in which we could attack the subject of plant diseases and the problems presented by them. The distribution of spores, for instance, is important. The methods of spore distribution are very various, among other agents being wind, insects, animals, etc., man himself often contributing. European plants conveyed to different parts of the world invariably carry their fungal diseases with them, and often with change of habitat the latter become far more virulent. Sometimes the seed only is imported and yet the disease manifests itself. As instances, potatoes, French beans, etc., have been introduced into Nyassaland and other places, and after a time those diseases known at home manifested themselves. I am in agreement with Eriksson's theory that the seed contains what is known as mycoplasm, which after a time—given favourable conditions—develops into mycelium. This is not generally held in this country chiefly through experiments made by Marshall Ward, who disproved it to his own satisfaction. Eriksson however, holds that propagation by spores alone is inadequate to account for the enormous simultaneous outbreaks of rusts such as have occurred for instance in the great plain of the Ganges in India and elsewhere, over very wide areas.

Experiments I have made show that spores are mostly liberated during the day, but infection takes place most readily during the night. The latter is on account of the presence of dew, moisture being an essential condition for spore germination.

Physiological factors are important in the question of whether infection takes place or not. Some plants have enzymes which are inimical to infection, and others have particular enzymes which are favourable to infection. In the case of the former the germ-tube of the fungus spore is poisoned on entering the cells of the plant not having the enzyme favourable to the invading fungus.

There is no such thing as an epidemic of fungi in say a virgin forest, i.e., where the balance of nature is undisturbed. Where economic plants are largely cultivated their physiological balance has been upset, and this renders them more open to attack; those plants which are tampered with most being most susceptible to disease.

Plant pathology is only about 25 years old, and there is much to learn as regards remedial measures. We have learnt how to diagnose a disease, and that is a good deal, but much remains to be done.

BIRDS.

Manx Shearwater at Halifax.—The Manx Shearwater picked up at Heptonstall, near Hebden Bridge (vide *The Naturalist*, November, p. 331), is not the *first* record of the species for the parish of Halifax, but the *third* of my own knowledge. In 'A List of the Vertebrate Fauna of Hebden Bridge and District, 1910,' a record occurs of a bird taken in 1908, not very far from the place where the latest specimen occurred. —WALTER GREAVES, Hebden Bridge.

—: o :—

FUNGI.

Remarkable Growth of *Coprinus comatus* near Harrogate.—On October 15th, I noticed a field in the distance

Photo by] ***Coprinus comatus.*** [*R. Fortune.*

covered with white, at first I thought it was caused by the Scentless Mayweed, quantities of which were then flowering in the neighbourhood. Closer investigation, however, showed that the field, about two acres in extent, was literally strewn with fungi, *Coprinus comatus*. A space of 27 yards by 25 yards was absolutely covered with batches, some of them very large, of the fungus. The remainder of the field was sprinkled over more or less thickly. I photographed several of the groups, but the area covered was too large to be included in a general photograph. Some years ago the field was excavated and used as a sand pit, subsequently the part excavated was filled in, and it was upon this area that the largest groups were to be seen.

Visiting the place again on the 19th, I found there were many new growths, but the great majority had been destroyed by cattle trampling over them, and a great number had rotted, leaving the grass as if it had been sprinkled with ink.—R. FORTUNE.

Abundance of *Coprinus comatus* at Lockwood.—This fungus has been unusually abundant on an old site at Lockwood this year. There were a good few from the middle of August into September, after which I was unable to visit the place for a few weeks. When I again went on October 5th, the ground for a small area was literally covered with them, a great quantity of which had matured and decayed into the characteristic black mass. Beside these there were innumerable sound ones and I gathered seventeen pounds weight in a very few minutes. The crop continued very prolific during the succeeding days, for between the 5th and the 12th I gathered thirty pounds, although only picking the 'best'; of the overgrown ones and very tiny buttons there still remained large quantities. This fungus is a delicacy worthy a place on any table.—CHARLES MOSLEY, Lockwood.

Coprinus comatus.—In Dr. M. C. Cooke's book on 'Edible and Poisonous Mushrooms,' reviewed in *The Naturalist*, March, 1895, page 81, this is said to be one of the best of edible species, and common especially on waste ground, building plots, etc., in and near towns. It generally grows in clusters with a long whitish shaggy cap, the cap and stem being occasionally eight or nine inches high, not uncommonly five or six. It is tender and delicious cooked in any way, and cannot be mistaken for anything else, but should be cooked while young and quite white and sound. It has long been known around Huddersfield, and about Hebden Bridge and Halifax for its edible qualities; sometimes called 'com-eat-us' among the Halifax botanists. It prefers 'made' ground, town tips especially, and comes up occasionally in newly laid lawns.—C. C.

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'Charles Waterfall. Plants from the County of Chester in his Collection, 1910-14.' 8vo, 10 pages. During his residence in the city of Chester (1910-14), Mr. Charles Waterfall, F.L.S., has not been idle so far as the observation of the flora of Cheshire is concerned. Twenty-six localities have been visited and a florula of each is given in the pamphlet. One is pleased to see that in highly cultivated Cheshire are still be to found such species as *Ranunculus Lenormandi* Schultz, *R. Lingua* Linn., *Euphorbia portlandica* Linn., *Juncus maritimus* Linn., *Butomus umbellatus*, *Senecio sarracenicus* Linn., *Stratiotes Aloides* Linn., *Drosera anglica* Huds., *Andromeda polifolia* Linn., *Acorus Calamus* Linn., *Cochlearia anglica* Linn., and *Lastræa Thelypteris* Bory. The lists give confirmation of many previous records, notably those for Delamere Forest. Mr. Waterfall deserves congratulation on his continued powers to tramp about the countryside. A few printers' errors have been overlooked in the correction of the sheets, but for all that, there is evidence that good work has been done of late by our veteran botanist.

GEOLOGICAL SECTION OF THE YORKSHIRE NATURALISTS' UNION AT HULL.*

In recent years it has been felt that in many of our scientific societies there has been a tendency to specialise, with the result that the beginner has not been able to follow the discussions, and the work of the societies has been left in the hands of fewer and fewer each year. With the object of bringing things back to the old regime, to some extent, the President of the Yorkshire Naturalists' Union, Mr. T. Sheppard, F.G.S., issued invitations to a conference at the Hull Museum on Saturday, November 7th, and at this no fewer than fourteen papers were read, in addition to which there were many interesting exhibits of geological specimens, maps, diagrams, etc., and some unusual experiments with the magic lantern ! There was a most satisfactory response to the invitation, there being representatives present from Manchester, Leeds, Bradford, Middlesbrough, Sheffield, Barnsley, Crosshills, Scarborough, Goole, etc. The conference was most successful, and it was decided to hold another next year at some other centre in the county.

During recent years a marked renascence has taken place in the Naturalists' Union as an organisation of natural history workers, and various sectional gatherings have been held with the result of greatly stimulating observation and research in the county. The meeting on Saturday was the first of its kind held by the Geological Section, though various geological committees have been at work with more or less energy for forty years. Mr. J. J. Burton (Middlesbrough) presided. In the course of the proceedings officers were elected for the various committees, and the visitors were entertained to tea by the Hull members.

Professor Kendall (Leeds University) initiated the proceedings with an address on the origin of the lakes of Yorkshire.

Mr. T. Sheppard laid before the meeting, on behalf of Mr. C. B. Newton, the Waterworks Engineer for Hull, the results of recent sinkings in the chalk for the improvement of the municipal water supply of Hull. The most interesting feature revealed in the borings was the presence beneath the glacial boulder-clay of an immense thickness of crushed chalk, or 'grut,' the condition of which was, it was suggested, due to the former extension over Holderness of the great glaciers of the North Sea.

An interesting discussion took place on the subject, Professor Kendall endorsing the suggestion of the origin of the crushed chalk, and putting the matter in the phrase, 'the glacier slid over Holderness on ball-bearings of chalk grut.'

Mr. George Sheppard laid before the meeting some important work in the investigation of the fossils of the chalk which threw new light on the identification of the beds with those of the chalk of the South of England.

Mr. J. W. Stather, gave an account of the glacial clays on the Holderness coast. He said that twenty-five years ago Mr. Clement Reid in a memoir classified the glacial clays in four divisions, Hessle clay (at the top), purple clay (in two divisions) in the middle, and a basement clay. At first the divisions are not very apparent, but a close examination of the sections shows that the Survey classification is the correct one. On one occasion when a great wash of sea cleared away the shore at Dimlington he had found a good section in the lowest bed. This was of greenish clay, highly charged with Arctic shells, and coarse quartzites, but without any pebbles of Carboniferous rocks. The basement beds and the purple

* We are indebted to the excellent reports in *The Yorkshire Observer* and other papers for these particulars, and to the former for the report of Professor Kendall's address.

clays of Mr. Clement Reid had about 80 per cent. of their pebbles of Yorkshire Carboniferous rocks or Norwegian rocks. The Hessle clays included large quantities of Cheviot and South Scottish rocks.

Professor Kendall, commenting upon the high significance and importance of the observations of Mr. George Sheppard and Mr. Stather, said that the work done by amateurs in science in England was the wonder of the Germans. Our friends the enemy never could understand how it was when they met a party of geologists in the field they were usually amateurs, with perhaps not a professor among them. Though, added the speaker, there are some professors who are amateurs too in the literal sense of the word.

Miss M. A. Johnstone, B.Sc. (of Manchester and late of Bradford) read some notes on an interesting calamite which she had collected in a clay-pit in Bradford. This threw much light on the growth of that plant.

Mr. John Holmes (Cross Hills) showed some lantern pictures of the stone quarries in the mill-stone grit about Keighley, and indicated the problems raised. A discussion followed, which was taken part in by Mr. A. Gilligan, (Leeds University).

Mr. J. J. Burton gave a lantern lecture on coast erosion in Yorkshire, in which he illustrated the various ways in which the cliffs are being worn away, especially where the rocks are of a soft nature.

Mr. W. R. Barker (Barnsley), described the 'Fossil Plants of the Coal Measures,' principally in the Barnsley area, and illustrated by lantern slides the remarkable structures of these ancient floras.

Mr. H. Hamshaw Thomas submitted a paper on 'The Thinnfeldia Leaf-bed of Roseberry Topping,' where a recent important discovery has been made, showing plant remains in an extraordinarily complete state of preservation. Mounted preparations of these were exhibited and kindly presented by Mr. Thomas to the museum. This paper will appear *in extenso* in *The Naturalist.*

Mr. T. Stainforth gave suggestions for 'A Central Collection of Indicator Boulders.'

Mr. C. Bradshaw, of the Sheffield Museum, exhibited some interesting geological specimens recently added to that institution.

Mr. H. C. Drake contributed a paper on some ammonites from a rock known as Cornbrash, which is so well developed in Peacock's quarry near Scarborough.

Mr. C. Thompson, of Hymers College, exhibited some of the more interesting ammonites from the Yorkshire glacial beds.

Mr. T. Sheppard handed round the publications of Mr. William Smith, the father of English geology, a set of which he has in his possession.

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Plant Life in the British Isles. By **A. R. Horwood,** Vol. II. London: Churchill, 1914, pp. 14 + 358, 6s. 6d. net. In the second volume of this work, which deals with selected types from the different natural orders of British plants, the author continues the introductory matter from vol. I., and deals briefly with the cell and tissues, the organs and their work, absorption, transpiration, respiration, photo-synthesis and transport of materials. In covering a wide field in short space, the author has allowed numerous errors to creep in, e.g., on p. 10 he says: 'In the cuticle of leaves are the stomata,' on the next page he speaks of 'the upward transport of starch'; we are told (p. 76), that in the Barberry 'there are long shoots with the leaves forming groups of spines owing to arrest of the branches.' Figure 3 of a ringed stem is likely to mislead and the description of it on p. 37 does not clear up the difficulty. Much interesting information is given in the description of the types which will prove helpful to many who wish to widen their knowledge of the common plants around them. The usefulness of the volume is enhanced by 71 photographs of the types dealt with, and there are also 7 clearly drawn diagrams.

CLASSIFIED INDEX.

COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators; the actual titles of papers not always being regarded so much as the essential nature of their contents.

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CORRIGENDA.

Page 94, line 32 and 35, *for* "Wakefield," *substitute* "Skipwith Common."
Page 146, line 21 from bottom, *for* "Selisia," *read* "Silesia."
Page 192, line 14 from bottom, *for* "1815," *read* "1592."
Page 241, line 13 from bottom, *for* "Geological," *read* "Geographical."

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T. SHEPPARD, F.G.S., F.R.G.S., F.S.A.Scot.,
THE MUSEUMS, HULL;
AND
T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.
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President of the Section :—H. B. Booth, Esq., M.B.O.U., F.Z.S.

Two Meetings will be held in Room C7 at the Leeds Institute, Leeds, at 3-15 p.m. and 6-30 p.m. respectively, on Saturday, February 21st, 1914.

Business :—

To appoint Bird Watchers for 1914, and discussion upon other matters in connection with the Yorkshire Wild Birds' and Eggs' Protection Acts Committee.

Papers (mostly illustrated by lantern slides or specimens) will be given as follows—

"The Wanderings of Sea Fishes," Professor W. Garstang.
"Further Notes from Spain," Dr. E. S. Steward, F.R.C.S., M.B.O.U.
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"Further Notes on the Stone Curlew," Mr. E. W. Wade, M.B.O.U.

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Any Member or Associate of the Y.N.U. is invited to attend and to bring notes, specimens, lanterns slides, etc., and is requested to bring forward matters of interest connected with the work of the Section, and to take part in any discussion.

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ENTOMOLOGICAL SECTION.

President of the Section—DR. E. O. CROFT, Leeds.

By the kind invitation of Professor GARSTANG, a Meeting will be held in the Zoological Department, The University, Leeds, at 3 p.m. on 21st March, 1914.

The "A. H. Clarke Collection of Exotic and European Lepidoptera" will be exhibited during the afternoon and evening.

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THE PLUMAGE BILL.

As was pointed out at the meeting of the Vertebrate Section of the Yorkshire Naturalists' Union at Leeds, a few days ago, the present is the most favourable opportunity for the passing of the Plumage Bill, and every possible effort should be made towards this end. As has been pointed out, Yorkshire naturalists were the first, many years ago, to commence the agitation against the wanton slaughter of rare birds for the sake of enriching the pockets of the dealers, and decorating the ladies. We trust that readers of *The Naturalist* will do their best by appealing to the Members of Parliament in their respective districts to support the Bill, and it would certainly help the movement if Natural History Societies were to pass resolutions asking their local M.P.'s to help it. We trust they will do so. Why ladies should want parts of beautiful birds in order to adorn themselves, goodness only knows, as they are certainly much more beautiful, and much more charming, without any decoration whatever.—T. S.

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ANNUAL MEETING OF THE ENTOMOLOGICAL SECTION.

President :—**Dr. E. O. CROFT, Leeds.**

Two Meetings will be held in the Leeds Institute, Cookridge Street, Leeds, at 3-30 p.m. and 6-15 p.m., respectively, on Saturday, October 31st, 1914.

BUSINESS AT THE AFTERNOON MEETING :—To consider and pass the sectional reports for 1914, and to elect officers for 1915.

Exhibitions of specimens of all orders of insects are invited. At the evening meeting several addresses on entomological topics will be contributed by the members.

All members and associates of thes Yorkhire Naturalists' Union are invited to attend and to bring any notes made during the season. In order that a correct and complete account of all exhibits may be included in the report, the secretaries particularly request that each may be accompanied by a discriptive note.

Officials of affiliated societies are earnestly requested to notify their members.

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GEOLOGICAL SECTION.

Hon. Secs.: C. BRADSHAW AND J. HOLMES.

A Meeting of the Geological Section of the Yorkshire Naturalists' Union will be held on the afternoon and evening of Saturday, November 7th, from 3 p.m. to 8-15 p.m. (with an hour's interval for tea at 5-30), at the Municipal Museum, Albion Street, Hull, by permission of the Museums Committee. A number of papers will be read and discussed, and these will be illustrated by diagrams, photographs, specimens, lantern slides, etc.

The following contributions have already been kindly promised :—

"The Origin of the Lakes of Yorkshire." Prof. P. F. Kendall, M.Sc., F.G.S. (Leeds).
"Coast Erosion in Yorkshire." Mr. J. J. Burton, F.G.S. (Middlesbrough).
"Problems of the Millstone Grit." Mr. John Holmes (Crosshills).
"Sections Exposed at the New Joint Dock, Hull." Mr. W. H. Crofts (Hull).
"Fossil Plants of the Coal Measures." Mr. W. R. Barker (Barnsley).
"The *Thinnfeldia* Leaf-Bed of Roseberry Topping." Mr. H. Hamshaw Thomas, M.A., F.G.S. (Cambridge).
"Geological Notes on Hull's Water Supply." Mr. C. B. Newton, Hull Waterworks Engineer.
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"Some Interesting Geological Specimens." Mr. C. Bradshaw, F.G.S. (Sheffield).
"The Vertical Distribution of Erratic Boulders." Mr. J. W. Stather, F.G.S. (Hull).
"The more interesting Ammonites from the Yorkshire Drift." Mr. C. Thompson (Hull).
"Notes on an Interesting Calamite." Miss M. A. Johnstone, B.Sc., F.L.S. (Manchester).
"Some Cornbrash Ammonites." Mr. H. C. Drake, F.G.S. (Scarborough).
"The Publications of William Smith." The President, Mr. T. Sheppard, F.G.S.
and, if time permits,
"The Arrangement of a Geological Gallery." Mr. T. Sheppard.

The Hull Members invite the visitors to take tea with them.

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Will those intending to be present KINDLY NOTIFY to Mr. T. Sheppard, Museum, Hull.

VERTEBRATE ZOOLOGY SECTION: ANNUAL MEETING.

President: H. B. BOOTH, Esq., M.B.O.U., F.Z.S.

Two Meetings will be held in Room C7 at the Leeds Institute, at 3-15 p.m. and 6-30 p.m. respectively on Saturday, November 21st, 1914.

BUSINESS AT THE AFTERNOON MEETING :—

To consider and pass Sectional Reports for 1914, and to elect Officers for 1915.
To consider and pass the General and Financial Reports of the Yorkshire Wild Birds' Protection Acts Committee for 1914, and to elect the Officers and Committee for 1915.
To consider and pass the Report of the Yorkshire Mammals, Amphibians, Reptiles and Fishes Committee for 1914, and to elect this Committee for 1915.

The following Papers (mostly illustrated by lantern slides or specimens) will be given :—

"Field Notes from South Wales," Mr. George Bolam.
"Home Life of the Merlin," Mr. F. Edmondson.
"The British Terns," Mr. Riley Fortune, F.Z.S.

Any Member or Associate of the Yorkshire Naturalists' Union is invited to attend, and to bring notes, specimens, lantern slides, etc., or matters of interest connected with the work of the Section, and to take part in any discussion.

Will officials of Affiliated Societies kindly notify their Members?

A Committee Meeting of the Yorkshire Wild Birds' and Eggs' Protection Acts Committee will be held at 2-30 p.m. All members of the Committee are requested to attend.

A. HAIGH-LUMBY *(Hon. Sec.)*,
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